FCC CFR47 PART 22 SUBPART H
FCC CFR47 PART 24 SUBPART E
FCC CFR47 PART 27 SUBPART L

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE Tablet + Bluetooth, DTS/UNII a/b/g/n & ANT+

MODEL NUMBER : SM-P555M

FCC ID: A3LSMP555M

REPORT NUMBER: 15K20096-E1

ISSUE DATE: MARCH 12, 2015

Prepared for
SAMSUNG ELECTRONICS CO., LTD.
129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,
GYEONGGI-DO, 443-742, KOREA

Prepared by
UL Korea, Ltd. Suwon Laboratory
218 Maeyeong-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 443-823, Korea
TEL: (031) 337-9902
FAX: (031) 213-5433

ACCREDITED
TL-637

Revision History

Rev.	Issue Date	Revisions	Revised By
--	03/12/15	Initial issue	CY Choi

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS 5

2. TEST METHODOLOGY 6

3. FACILITIES AND ACCREDITATION 6

4. CALIBRATION AND UNCERTAINTY 6

4.1. MEASURING INSTRUMENT CALIBRATION 6

4.2. SAMPLE CALCULATION 6

4.3. MEASUREMENT UNCERTAINTY 6

5. EQUIPMENT UNDER TEST 7

5.1. DESCRIPTION OF EUT 7

5.2. MAXIMUM OUTPUT POWER (GSM) 7

5.3. MAXIMUM OUTPUT POWER (WCDMA) 7

5.4. MAXIMUM OUTPUT POWER (LTE) 8

5.5. DESCRIPTION OF AVAILABLE ANTENNAS 9

5.6. DESCRIPTION OF TEST SETUP 9

6. TEST AND MEASUREMENT EQUIPMENT 11

7. Summary Table 12

8. RF POWER OUTPUT VERIFICATION 13

8.1. GSM/GPRS/EDGE 13

8.1.1. GSM OUTPUT POWER RESULT 14

8.2. UMTS REL 99 16

8.1. LTE OUTPUT VERIFICATION 23

8.1.1. LTE OUTPUT RESULT 24

9. PEAK TO AVERAGE RATIO 30

9.1. CONDUCTED PEAK TO AVERAGE RESULT 30

9.2. CONDUCTED PEAK TO AVERAGE PLOTS 32

10. LIMITS AND CONDUCTED RESULTS 38

10.1. OCCUPIED BANDWIDTH 38

10.1.1. OCCUPIED BANDWIDTH RESULTS 38

10.1.2. OCCUPIED BANDWIDTH PLOTS 42

10.2. BAND EDGE EMISSIONS 59

10.2.1. BAND EDGE PLOTS 60

10.3. OUT OF BAND EMISSIONS 89

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

10.3.1. OUT OF BAND EMISSIONS RESULT 89
10.3.2. OUT OF BAND EMISSIONS PLOTS.....93

10.1. FREQUENCY STABILITY 110
10.1.1. FREQUENCY STABILITY RESULTS.....111

11. RADIATED TEST RESULTS 114

11.1. RADIATED POWER (ERP & EIRP).....114
11.1.1. ERP/EIRP Results.....115
11.1.2. ERP/EIRP DATA.....119

11.2. FIELD STRENGTH OF SPURIOUS RADIATION 136
11.2.1. SPURIOUS RADIATION PLOTS.....137

12. SETUP PHOTOS 171

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE Tablet + Bluetooth, DTS/UNII a/b/g/n & ANT+
MODEL NUMBER:	SM-P555M
SERIAL NUMBER:	R32G201SC1H (RADIATED); R38G201SC1H (CONDUCTED)
DATE TESTED:	FEBRUARY 23 - MARCH 07, 2015

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 22H, 24E, 27L	Pass

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Korea, Ltd. By:

Ji Ho Choi
Suwon Lab Manager
UL Korea, Ltd.

Tested By:

CY Choi
Suwon Lab Engineer
UL Korea, Ltd.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA-603-C, FCC CFR 47 Part 22, FCC CFR Part 24 & FCC CFR Part 27.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro
☒ Chamber 1
☐ Chamber 2

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at http://www.iasonline.org/PDF/TL/TL-637.pdf.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

EIRP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – cable loss(between the SG and substitution antenna) + Substitution Antenna Factor (dBi)

ERP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – cable loss(between the SG and substitution antenna)

(Path loss = Signal generator output – PSA reading with substitution antenna)

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	2.32 dB
Radiated Disturbance, Below 1GHz	4.14 dB
Radiated Disturbance, Above 1 GHz	5.97 dB

Uncertainty figures are valid to a confidence level of 95%.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Tablet + Bluetooth, DTS/UNII a/b/g/n & ANT+.

5.2. MAXIMUM OUTPUT POWER (GSM)

The transmitter has a maximum peak conducted and radiated ERP / EIRP output powers as follows:

FCC Part 22/24						
Band	Frequency Range(MHz)	Modulation Peak	Conducted		Radiated	
			Avg (dBm)	Avg (mW)	Avg (dBm)	Avg (mW)
GSM850	824~849	GMSK	33.5	2238.7		
		GPRS	33.5	2238.7	29.07	806.3
		EGPRS	26.5	446.7	23.23	210.1
GSM1900	1850~1910	GMSK	30.3	1071.5		
		GPRS	30.4	1096.5	31.03	1267.7
		EGPRS	25.5	354.8	23.39	218.2

5.3. MAXIMUM OUTPUT POWER (WCDMA)

The transmitter has a maximum peak conducted and radiated ERP / EIRP output powers as follows:

FCC Part 22/24						
Band	Frequency Range(MHz)	Modulation Peak	Conducted		Radiated	
			Avg (dBm)	Avg (mW)	Avg (dBm)	Avg (mW)
Band 5	824~849	REL99	22.6	182.0	18.28	67.2
		HSDPA	22.0	158.5	17.32	53.9
		HSUPA	22.0	158.5		
Band 4	1710~1755	REL99	23.4	218.8	25.68	369.8
		HSDPA	22.9	195.0	24.71	296.0
		HSUPA	23.0	199.5		
Band 2	1850~1910	REL99	22.0	158.5	30.24	1056.8
		HSDPA	21.4	138.0	23.23	210.4
		HSUPA	21.5	141.3		

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

5.4. MAXIMUM OUTPUT POWER (LTE)

The transmitter has a maximum peak conducted and radiated ERP/EIRP output powers as follows:

FCC Part 24/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				Avg (dBm)	Avg(mW)	Avg (dBm)	Avg(mW)
Band 4	1710~1755	20MHz	QPSK	23.5	223.9	23.53	225.2
			16QAM	23.1	204.2	22.14	163.6
		15MHz	QPSK	23.3	213.8	23.11	204.5
			16QAM	23.4	218.8	22.51	178.1
		10MHz	QPSK	23.4	218.8	20.75	118.7
			16QAM	23.1	204.2	20.29	106.9
		5MHz	QPSK	23.5	223.9	23.06	202.1
			16QAM	23.2	208.9	21.88	154.0
		3MHz	QPSK	23.6	229.1	22.67	184.8
			16QAM	23.1	204.2	21.67	146.8
		1.4MHz	QPSK	23.3	213.8	19.46	88.2
			16QAM	23.4	218.8	18.76	75.1
Band 2	1850~1910	20MHz	QPSK	22.9	195.0	24.13	258.6
			16QAM	23.3	213.8	23.15	206.3
		15MHz	QPSK	22.7	186.2	24.13	258.6
			16QAM	22.5	177.8	22.68	185.2
		10MHz	QPSK	22.8	190.5	24.58	286.8
			16QAM	22.9	195.0	23.54	225.7
		5MHz	QPSK	23.5	223.9	23.64	231.0
			16QAM	22.3	169.8	24.51	282.2
		3MHz	QPSK	23.0	199.5	24.64	290.8
			16QAM	22.6	182.0	23.24	210.7
		1.4MHz	QPSK	22.9	195.0	21.39	137.6
			16QAM	22.5	177.8	20.20	104.6

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

5.5. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna for the [List the bands supported] with a maximum peak gain as follow:

Frequency (MHz)	Peak Gain (dBi)
GSM 850 / WCDMA & LTE Band 5 824 ~ 849 MHz	-0.01
GSM 1900 / WCDMA Band 2 1850 ~ 1910 MHz	-0.28
WCDMA Band & LTE Band 4 1710 ~ 1755 MHz	-1.80

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Charger	SAMSUNG	EP-TA12EWE	N/A	N/A
Data Cable	SAMSUNG	ECB-DU28WE	N/A	N/A
Earphone	SAMSUNG	GH59-11129H	N/A	N/A

I/O CABLES (CONDUCTED SETUP)

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	RF Out	1	Spectrum Analyzer	Shielded	0.2m	NA
2	Antenna Port	1	EUT	Shielded	0.5m	NA
3	RF In/Out	1	Communication Test Set	Shielded	0.5m	NA

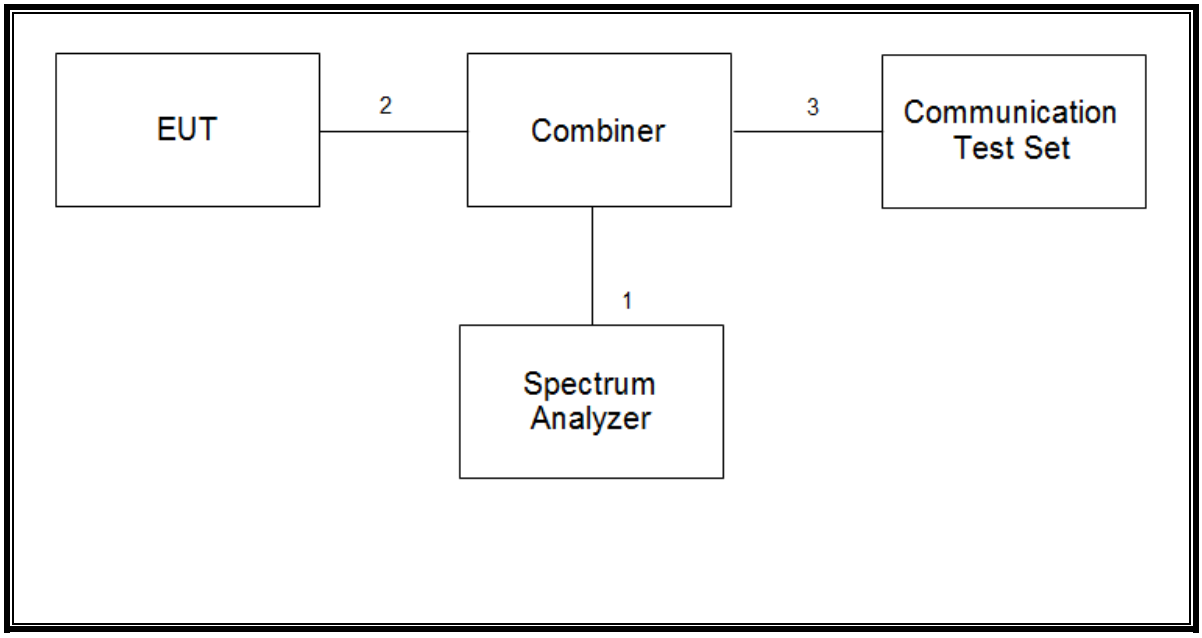
I/O CABLES (RADIATED SETUP)

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	USB	1	AC Adapter	Shielded	0.8m	No
2	Jack	1	Headset	Un-shielded	1.0m	No
3	RF In/out	1	Communication Test Set	Shielded	2.0m	Yes

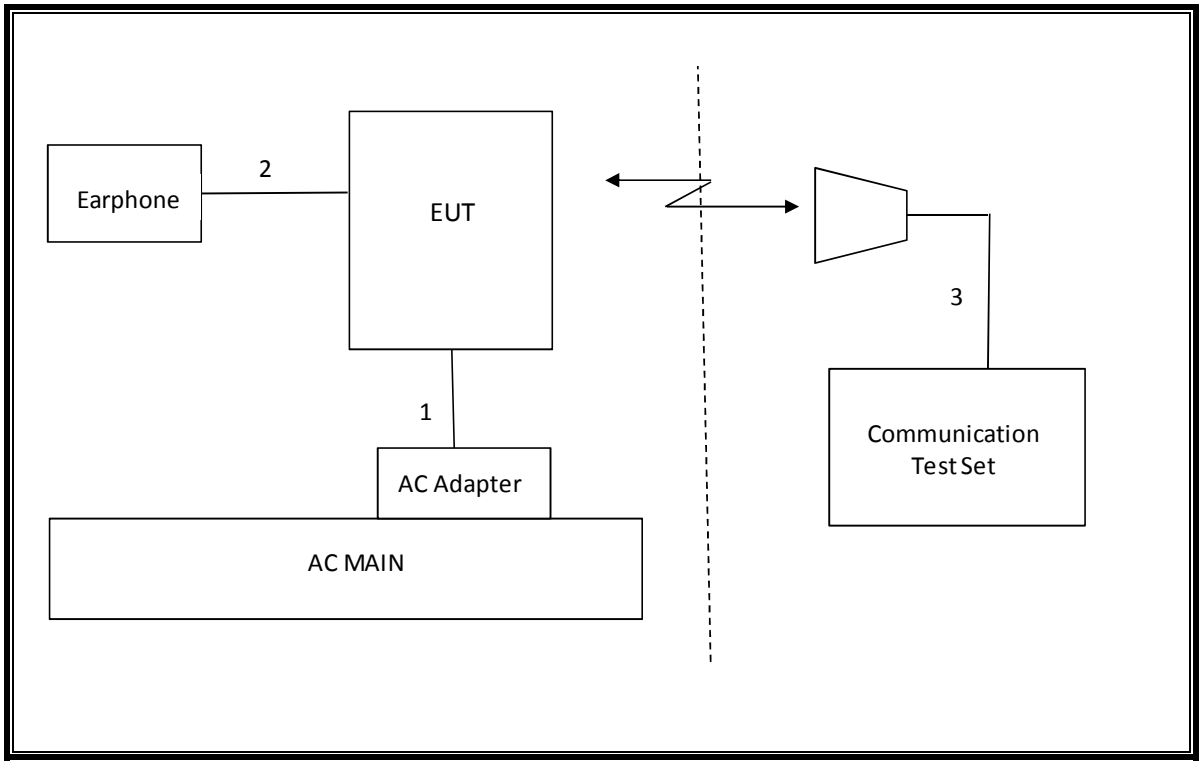
The EUT is continuously communicated to the call box during the tests.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List				
Description	**Manufacturer**	**Model**	**S/N**	**Cal Due**
Antenna, Tuned Dipole 400~1000 MHz	ETS	3121D DB4	00164753	07-29-11
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	950	11-17-15
Antenna, Horn, 18 GHz	ETS	3115	00167211	09-20-15
Antenna, Horn, 40 GHz	ETS	3116C	00166255	09-23-15
Antenna, Horn, 40 GHz	ETS	3116C-PA	00168841	09-29-15
Preamplifier, 1000 MHz	Sonoma	310N	341282	11-17-15
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	11-18-15
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	09-23-15
Communications Test Set	R&S	CMW500	150312	08-13-15
Average Power Sensor	R&S	NRZ-Z91	102681	11-17-15
Average Power Sensor	Agilent / HP	U2000	MY54270007	09-23-15
EMI Test Receive, 40 GHz	R&S	ESU40	100439	11-17-15
EMI Test Receive, 3 GHz	R&S	ESR3	101832	11-17-15
Attenuator / Switch driver	HP	11713A	3748A04272	N/A
Low Pass Filter 3GHz	Micro-Tronics	LPS17541	009	11-17-15
High Pass Filter 5GHz	Micro-Tronics	HPS17542	009	11-17-15
High Pass Filter 6GHz	Micro-Tronics	HPM17543	010	11-17-15
Combiner	WEINSCHEL	1575	2153	11-17-15
Temperature Chamber	ESPEC	SH-642	93001109	11-13-15
DC Power Supply	Agilent / HP	E3640A	MY54226395	09-23-15

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

7. Summary Table

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result	Note
2.1049	Occupied Band width (99%)	N/A	Conducted	Pass	17.922 MHz
22.917(a) 24.238(a) 27.53(g) 90.691	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-20.85 dBm
2.1046	Conducted output power	N/A		Pass	33.5 dBm
22.355 24.235 27.54 90.213	Frequency Stability	2.5PPM		Pass	0.008PPM
22.913(a)(2)	Effective Radiated Power	38 dBm	Radiated	Pass	29.07 dBm
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power	33dBm		Pass	31.03 dBm
27.50(d)(4)		30dBm		Pass	25.68 dBm
22.917(a) 24.238(a) 27.53(g)	Radiated Spurious Emission	-13dBm		Pass	-20.8 dBm

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

8. RF POWER OUTPUT VERIFICATION

8.1. GSM/GPRS/EDGE

Function: Menu select > GSM Mobile Station > GSM 850/900/1800/1900
Press Connection control to choose the different menus
Press RESET > choose all to reset all settings
Connection Press Signal Off to turn off the signal and change settings
Network Support > GSM+GPRS or GSM+EGPRS
Main Service > Packet Data
Service selection > Test Mode A – Auto Slot Config. off
MS Signal Press Slot Config bottom on the right twice to select and change the number of time slots and power setting
> Slot configuration > Uplink/Gamma
> 33 dBm for GPRS 850/900
> 30 dBm for GPRS1800/1900
BS Signal Enter the same channel number for TCH channel (test channel) and BCCH channel
Frequency Offset > + 0 Hz
Mode > BCCH and TCH
BCCH Level > -85 dBm (May need to adjust if link is not stable)
BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]
Channel Type > Off
P0> 4 dB
Slot Config > Unchanged (if already set under MS Signal)
TCH > choose desired test channel
Hopping > Off
Main Timeslot > 3 (Default)
Network Coding Scheme > CS4 (GPRS) and MCS5 ~ MCS9 (EGPRS)
Bit Stream > 2E9-1PSR Bit Pattern
AF/RF Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input
Connection Press Signal On to turn on the signal and change settings

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

8.1.1. GSM OUTPUT POWER RESULT

GSM850 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max. Power	
						Burst Pwr (dBm)	Frame Pwr (dBm)
850	GSM (Voice)	CS1	1	128	824.2	33.3	24.2
				190	836.6	33.4	24.4
				251	848.8	33.5	24.5
	GPRS (GMSK)	CS1	1	128	824.2	33.3	24.2
				190	836.6	33.4	24.4
				251	848.8	33.5	24.5
			2	128	824.2	29.7	23.7
				190	836.6	29.9	23.9
				251	848.8	30.0	24.0
			3	128	824.2	28.6	24.3
				190	836.6	28.7	24.5
				251	848.8	28.9	24.6
			4	128	824.2	26.2	23.2
				190	836.6	26.4	23.4
				251	848.8	26.3	23.3
	EGPRS (8PSK)	MCS5	1	128	824.2	26.4	17.3
				190	836.6	26.4	17.4
				251	848.8	26.5	17.5
			2	128	824.2	25.1	19.1
				190	836.6	25.3	19.3
				251	848.8	25.4	19.4
			3	128	824.2	24.3	20.0
				190	836.6	24.3	20.1
				251	848.8	24.4	20.2
			4	128	824.2	23.3	20.2
				190	836.6	23.3	20.3
				251	848.8	23.4	20.4

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

GSM1900 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Max. Power	
						Burst Pwr (dBm)	Frame Pwr (dBm)
1900	GSM (Voice)	CS1	1	512	1850.2	30.1	21.1
				661	1880.0	30.4	21.4
				810	1909.8	30.3	21.3
	GPRS (GMSK)	CS1	1	512	1850.2	29.9	20.9
				661	1880.0	30.4	21.4
				810	1909.8	30.3	21.3
			2	512	1850.2	27.8	21.8
				661	1880.0	27.9	21.9
				810	1909.8	28.0	22.0
			3	512	1850.2	25.6	21.3
				661	1880.0	25.7	21.4
				810	1909.8	25.8	21.5
			4	512	1850.2	24.3	21.3
				661	1880.0	24.4	21.4
				810	1909.8	24.5	21.5
	EGPRS (8PSK)	MCS5	1	512	1850.2	25.2	16.2
				661	1880.0	25.5	16.5
				810	1909.8	25.5	16.5
			2	512	1850.2	24.2	18.2
				661	1880.0	24.4	18.4
				810	1909.8	24.5	18.5
			3	512	1850.2	23.2	18.9
				661	1880.0	23.4	19.1
				810	1909.8	23.3	19.0
			4	512	1850.2	21.5	18.5
				661	1880.0	21.7	18.7
				810	1909.8	21.7	18.7

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

8.2. UMTS REL 99

Release 99 Setup Procedures used to establish the test signals

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The DUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 2
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	βc/βd	8/15

HSDPA Setup Procedures used to establish the test signals

The following 4 Sub-tests were completed according to Release 7 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	11/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs=βhs/βc	30/15			

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

HSPA (HSDPA & HSUPA) Setup Procedures used to establish the test signals

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSPA				
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2 kbps RMC				
	HSDPA FRC	H-Set 1				
	HSUPA Test	HSPA				
	Power Control Algorithm	Algorithm 2				Algorithm 1
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	0
	βec	209/225	12/15	30/15	2/15	5/15
	βc/βd	11/15	6/15	15/9	2/15	15/1
	βhs	22/15	12/15	30/15	4/15	5/15
	βed	1309/225	94/75	47/15	56/75	47/15
	CM (dB)	1	3	2	3	1
	MPR (dB)	0	2	1	2	0
HSDPA Specific Settings	DACK	8				0
	DNAK	8				0
	DCQI	8				0
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	E-DPDCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E-TFCIs	5	5	2	5	1
	Reference E-TFCI	11	11	11	11	67
	Reference E-TFCI PO	4	4	4	4	18
	Reference E-TFCI	67	67	92	67	67
	Reference E-TFCI PO	18	18	18	18	18
	Reference E-TFCI	71	71	71	71	71
	Reference E-TFCI PO	23	23	23	23	23
	Reference E-TFCI	75	75	75	75	75
	Reference E-TFCI PO	26	26	26	26	26
	Reference E-TFCI	81	81	81	81	81
	Reference E-TFCI PO	27	27	27	27	27
	Maximum Channelisation Codes	2xSF2				SF4

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

DC-HSDPA Setup Procedures used to establish the test signals

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0

Table E.5.0: Levels for HSDPA connection setup

Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH _Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.		
Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

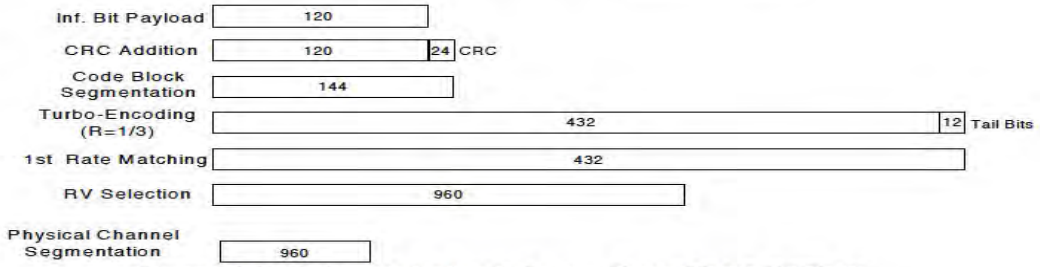


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

The following 4 Sub-tests for HSDPA were completed according to Release 8 procedures in section 5.2 of 3GPP TS34.121. A summary of subtest settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm2			
	βc	2/15	11/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	βd (SF)	64			
	βc/βd	2/15	11/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	Ahs = βhs/ βc	30/15			

HSPA+

Since 16QAM is not used for uplink, the uplink Category and release is same as HSUPA, i.e., CAT 6 Rel 6. Therefore, the RF conducted power is not measured.

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Measured Results

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Avg Pwr (dBm) Max
W-CDMA Band II	Rel 99	RMC, 12.2 kbps	9262	1852.4	N/A	22.0
			9400	1880.0	N/A	21.9
			9538	1907.6	N/A	21.8
	HSDPA	Subtest 1	9262	1852.4	0	21.4
			9400	1880.0	0	21.4
			9538	1907.6	0	21.3
		Subtest 2	9262	1852.4	0	21.1
			9400	1880.0	0	20.9
			9538	1907.6	0	20.9
		Subtest 3	9262	1852.4	0.5	21.0
			9400	1880.0	0.5	20.8
			9538	1907.6	0.5	20.5
		Subtest 4	9262	1852.4	0.5	20.8
			9400	1880.0	0.5	20.8
			9538	1907.6	0.5	20.7
	HSUPA	Subtest 1	9262	1852.4	0	21.4
			9400	1880.0	0	21.0
			9538	1907.6	0	20.5
		Subtest 2	9262	1852.4	2	19.4
			9400	1880.0	2	19.3
			9538	1907.6	2	19.2
		Subtest 3	9262	1852.4	1	19.5
			9400	1880.0	1	19.8
			9538	1907.6	1	19.6
		Subtest 4	9262	1852.4	2	19.9
			9400	1880.0	2	19.8
			9538	1907.6	2	19.6
		Subtest 5	9262	1852.4	0	21.5
			9400	1880.0	0	21.4
			9538	1907.6	0	21.3
	DC-HSPA	Subtest 1	9262	1852.4	0	21.5
			9400	1880.0	0	21.3
			9538	1907.6	0	21.3
		Subtest 2	9262	1852.4	0	21.2
			9400	1880.0	0	20.9
			9538	1907.6	0	21.0
		Subtest 3	9262	1852.4	0.5	21.0
			9400	1880.0	0.5	20.9
			9538	1907.6	0.5	20.8
		Subtest 4	9262	1852.4	0.5	21.0
			9400	1880.0	0.5	20.9
			9538	1907.6	0.5	20.9

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Avg Pwr (dBm) Max
W-CDMA Band IV	Rel 99	RMC, 12.2 kbps	1312	1712.4	N/A	23.2
			1413	1732.6	N/A	23.2
			1513	1752.6	N/A	23.4
	HSDPA	Subtest 1	1312	1712.4	0	22.8
			1413	1732.6	0	22.8
			1513	1752.6	0	22.9
		Subtest 2	1312	1712.4	0	22.3
			1413	1732.6	0	22.2
			1513	1752.6	0	22.6
		Subtest 3	1312	1712.4	0.5	22.3
			1413	1732.6	0.5	22.2
			1513	1752.6	0.5	22.4
		Subtest 4	1312	1712.4	0.5	22.2
			1413	1732.6	0.5	22.3
			1513	1752.6	0.5	22.5
	HSUPA	Subtest 1	1312	1712.4	0	22.1
			1413	1732.6	0	22.6
			1513	1752.6	0	22.7
		Subtest 2	1312	1712.4	1.5	20.7
			1413	1732.6	1.5	21.3
			1513	1752.6	1.5	21.5
		Subtest 3	1312	1712.4	1	21.4
			1413	1732.6	1	21.3
			1513	1752.6	1	21.4
		Subtest 4	1312	1712.4	1.5	21.7
			1413	1732.6	1.5	21.3
			1513	1752.6	1.5	22.1
		Subtest 5	1312	1712.4	0	22.8
			1413	1732.6	0	22.8
			1513	1752.6	0	23.0
	DC-HSPA	Subtest 1	1312	1712.4	0	22.7
			1413	1732.6	0	22.7
			1513	1752.6	0	22.9
		Subtest 2	1312	1712.4	0	22.4
			1413	1732.6	0	22.4
			1513	1752.6	0	22.6
		Subtest 3	1312	1712.4	0.5	22.3
			1413	1732.6	0.5	22.3
			1513	1752.6	0.5	22.3
		Subtest 4	1312	1712.4	0.5	22.3
			1413	1732.6	0.5	22.3
			1513	1752.6	0.5	22.5

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Avg Pwr (dBm) Max
W-CDMA Band V	Rel 99	RMC, 12.2 kbps	4132	826.4	N/A	22.5
			4183	836.6	N/A	22.6
			4233	846.6	N/A	22.5
	HSDPA	Subtest 1	4132	826.4	0	22.0
			4183	836.6	0	21.9
			4233	846.6	0	22.0
		Subtest 2	4132	826.4	0	21.5
			4183	836.6	0	21.7
			4233	846.6	0	21.7
		Subtest 3	4132	826.4	0.5	21.4
			4183	836.6	0.5	21.6
			4233	846.6	0.5	21.5
		Subtest 4	4132	826.4	0.5	21.4
			4183	836.6	0.5	21.5
			4233	846.6	0.5	21.4
	HSUPA	Subtest 1	4132	826.4	0	21.3
			4183	836.6	0	21.9
			4233	846.6	0	21.9
		Subtest 2	4132	826.4	2	19.9
			4183	836.6	2	19.9
			4233	846.6	2	20.0
		Subtest 3	4132	826.4	1	20.3
			4183	836.6	1	20.0
			4233	846.6	1	20.1
		Subtest 4	4132	826.4	2	20.4
			4183	836.6	2	20.5
			4233	846.6	2	20.5
		Subtest 5	4132	826.4	0	21.9
			4183	836.6	0	22.0
			4233	846.6	0	21.9
	DC-HSPA	Subtest 1	4132	826.4	0	22.0
			4183	836.6	0	21.8
			4233	846.6	0	22.0
		Subtest 2	4132	826.4	0	21.6
			4183	836.6	0	21.5
			4233	846.6	0	21.6
		Subtest 3	4132	826.4	0.5	21.4
			4183	836.6	0.5	21.4
			4233	846.6	0.5	21.5
		Subtest 4	4132	826.4	0.5	21.4
			4183	836.6	0.5	21.5
			4233	846.6	0.5	21.5

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

8.1. LTE OUTPUT VERIFICATION

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.
UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signalling Value of "NS_01".

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23[1]	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-
Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.					

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

8.1.1. LTE OUTPUT RESULT

LTE Band 2 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm) Max. Power		
							1860 MHz	1880 MHz	1900 MHz
LTE Band 2	20	QPSK	1	0	0	0	22.3	23.3	22.7
			1	50	0	0	22.3	22.9	22.6
			1	99	0	1	22.3	22.6	22.7
			50	0	1	2	21.6	21.6	21.7
			50	25	1	2	21.6	21.6	21.7
			50	50	1	2	21.5	21.5	21.7
			100	0	1	2	21.6	21.6	21.7
		16QAM	1	0	1	0	21.5	21.6	23.3
			1	50	1	0	21.7	21.6	23.3
			1	99	1	0	21.4	21.7	23.3
			50	0	2	3	20.5	20.7	20.6
			50	25	2	3	20.4	20.6	20.5
			50	50	2	3	20.5	20.5	20.5
			100	0	2	3	20.6	20.6	20.6

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm) Max. Power		
							1857.5 MHz	1880 MHz	1902.5 MHz
LTE Band 2	15	QPSK	1	0	0	0	22.6	22.7	22.7
			1	36	0	0	22.6	22.7	22.5
			1	74	0	0	22.6	22.6	22.5
			36	0	1	1	21.5	21.7	21.7
			36	18	1	1	21.5	21.5	21.7
			36	37	1	1	21.5	21.5	21.7
			75	0	1	1	21.5	21.6	21.7
		16QAM	1	0	1	0	22.3	21.8	22.5
			1	36	1	0	21.8	21.7	22.3
			1	74	1	0	21.5	21.6	22.5
			36	0	2	2	20.5	20.9	20.6
			36	18	2	2	20.5	20.8	20.8
			36	37	2	2	20.7	20.8	20.9
			75	0	2	2	20.6	20.8	20.9

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm) Max. Power		
							1855 MHz	1880 MHz	1905 MHz
LTE Band 2	10	QPSK	1	0	0	0	22.7	22.6	22.6
			1	25	0	0	22.5	22.5	22.7
			1	49	0	0	22.5	22.8	22.7
			25	0	1	1	21.5	21.6	21.7
			25	12	1	1	21.6	21.6	21.7
			25	25	1	1	21.5	21.6	21.8
			50	0	1	1	21.5	21.6	21.7
		16QAM	1	0	1	0	22.1	22.1	22.7
			1	25	1	0	22.0	21.8	22.9
			1	49	1	0	21.2	22.5	21.6
			25	0	2	2	20.4	20.8	20.9
			25	12	2	2	20.6	20.8	21.0
			25	25	2	2	20.5	20.8	20.9
			50	0	2	2	20.5	20.7	20.9

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 2 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm) Max. Power		
							1860 MHz	1880 MHz	1900 MHz
LTE Band 2	5	QPSK	1	0	0	1	22.4	22.8	22.8
			1	12	0	0	22.9	23.0	23.5
			1	24	0	1	22.1	22.7	22.8
			12	0	1	2	21.4	21.5	21.6
			12	7	1	2	21.3	21.5	21.6
			12	13	1	2	21.4	21.5	21.7
			25	0	1	2	21.4	21.6	21.6
		16QAM	1	0	1	2	21.1	21.5	21.8
			1	12	1	1	21.1	22.1	22.1
			1	24	1	1	22.3	21.4	21.9
			12	0	2	3	20.4	20.8	20.5
			12	7	2	3	20.4	20.8	20.5
			12	13	2	3	20.2	20.5	20.8
			25	0	2	3	20.4	20.5	20.9

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm) Max. Power		
							1857.5 MHz	1880 MHz	1902.5 MHz
LTE Band 2	3	QPSK	1	0	0	0	22.5	22.7	22.6
			1	8	0	0	22.5	23.0	22.5
			1	14	0	0	22.4	22.7	22.5
			8	0	1	1	21.5	21.5	21.6
			8	4	1	1	21.4	21.6	21.5
			8	7	1	1	21.4	21.6	21.8
			15	0	1	1	21.4	21.6	21.7
		16QAM	1	0	1	1	21.9	22.2	22.1
			1	8	1	0	21.1	21.9	22.6
			1	14	1	1	21.9	22.5	21.8
			8	0	2	2	20.6	20.5	20.7
			8	4	2	2	20.4	20.6	20.8
			8	7	2	2	20.4	20.5	21.0
			15	0	2	2	20.5	20.8	20.5

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm) Max. Power		
							1855 MHz	1880 MHz	1905 MHz
LTE Band 2	1.4	QPSK	1	0	0	0	22.5	22.7	22.6
			1	3	0	0	22.4	22.8	22.6
			1	5	0	0	22.5	22.4	22.6
			3	0	0	0	22.5	22.6	22.8
			3	1	0	0	22.6	22.6	22.9
			3	3	0	0	22.5	22.7	22.8
			6	0	1	1	21.5	21.5	21.7
		16QAM	1	0	1	0	22.2	22.5	22.4
			1	3	1	1	22.1	21.8	22.0
			1	5	1	1	21.6	22.2	21.9
			3	0	1	1	21.5	21.4	21.5
			3	1	1	1	21.4	21.5	21.3
			3	3	1	1	21.6	22.1	21.8
			6	0	2	2	20.4	20.6	20.9

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 4 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm) Max. Power		
							1860 MHz	1880 MHz	1900 MHz
LTE Band 4	20	QPSK	1	0	0	0	23.0	23.2	23.3
			1	49	0	0	23.5	23.1	23.3
			1	99	0	0	23.2	23.1	23.3
			50	0	1	1	22.1	22.3	22.3
			50	24	1	1	22.1	22.2	22.3
			50	50	1	1	22.2	22.2	22.4
			100	0	1	1	22.1	22.2	22.3
		16QAM	1	0	1	0	22.1	23.1	22.9
			1	49	1	0	22.0	23.1	22.9
			1	99	1	0	21.9	23.1	22.9
			50	0	2	2	21.1	21.3	21.2
			50	24	2	2	21.0	21.2	21.2
			50	50	2	2	21.0	21.3	21.2
			100	0	2	2	21.1	21.1	21.3

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm) Max. Power		
							1857.5 MHz	1880 MHz	1902.5 MHz
LTE Band 4	15	QPSK	1	0	0	0	23.0	23.3	23.2
			1	37	0	0	23.0	23.2	23.0
			1	74	0	0	23.0	23.2	23.2
			36	0	1	1	22.2	22.3	22.3
			36	20	1	1	22.2	22.2	22.3
			36	39	1	1	22.2	22.2	22.3
			75	0	1	1	22.1	22.3	22.3
		16QAM	1	0	1	0	22.7	22.5	23.4
			1	37	1	0	22.6	22.5	23.4
			1	74	1	0	22.7	22.3	23.3
			36	0	2	2	21.1	21.2	21.2
			36	20	2	2	21.0	21.1	21.2
			36	39	2	2	21.0	21.0	21.2
			75	0	2	2	21.1	21.3	21.1

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm) Max. Power		
							1855 MHz	1880 MHz	1905 MHz
LTE Band 4	10	QPSK	1	0	0	0	23.3	23.4	23.2
			1	25	0	0	22.9	23.0	23.2
			1	49	0	0	23.1	23.0	23.3
			25	0	1	1	22.1	22.2	22.3
			25	12	1	1	22.2	22.2	22.3
			25	25	1	1	22.1	22.2	22.4
			50	0	1	1	22.2	22.3	22.4
		16QAM	1	0	1	0	22.4	23.1	22.2
			1	25	1	0	22.1	22.9	22.4
			1	49	1	1	21.9	22.6	21.7
			25	0	2	2	21.2	21.3	21.3
			25	12	2	2	21.1	21.3	21.6
			25	25	2	2	21.1	21.4	21.6
			50	0	2	2	21.0	21.2	21.3

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 4 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm) Max. Power		
							1860 MHz	1880 MHz	1900 MHz
LTE Band 4	5	QPSK	1	0	0	0	23.1	23.1	23.2
			1	12	0	0	22.5	23.1	23.5
			1	24	0	0	22.8	23.0	23.1
			12	0	1	1	22.0	22.2	22.2
			12	7	1	1	22.0	22.2	22.2
			12	13	1	1	22.0	22.3	22.3
			25	0	1	1	22.1	22.2	22.4
		16QAM	1	0	1	0	21.7	21.8	23.2
			1	12	1	2	21.6	21.9	21.7
			1	24	1	1	21.9	22.0	22.8
			12	0	2	2	20.9	21.2	21.3
			12	7	2	2	20.8	21.2	21.3
			12	13	2	2	21.1	21.3	21.3
			25	0	2	2	21.1	21.1	21.3

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm) Max. Power		
							1857.5 MHz	1880 MHz	1902.5 MHz
LTE Band 4	3	QPSK	1	0	0	0	23.1	23.1	23.1
			1	8	0	0	23.4	23.0	23.6
			1	14	0	0	23.1	23.2	23.1
			8	0	1	1	22.2	22.1	22.2
			8	4	1	1	22.2	22.1	22.3
			8	7	1	1	22.1	22.2	22.3
			15	0	1	1	22.1	22.3	22.3
		16QAM	1	0	1	1	22.4	22.5	22.0
			1	8	1	1	22.9	22.4	22.6
			1	14	1	1	22.8	23.1	22.5
			8	0	2	2	21.3	20.8	21.5
			8	4	2	2	21.0	21.1	21.5
			8	7	2	2	20.8	21.1	21.6
			15	0	2	2	21.1	21.0	21.2

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm) Max. Power		
							1855 MHz	1880 MHz	1905 MHz
LTE Band 4	1.4	QPSK	1	0	0	0	23.2	23.1	23.2
			1	3	0	0	23.0	23.0	23.2
			1	5	0	0	23.0	23.0	23.0
			3	0	0	0	23.1	23.1	23.2
			3	1	0	0	23.1	23.3	23.3
			3	3	0	0	23.0	23.1	23.3
			6	0	1	1	22.1	22.2	22.2
		16QAM	1	0	1	0	22.5	22.3	23.4
			1	3	1	0	23.0	22.2	22.6
			1	5	1	0	22.8	22.2	23.3
			3	0	1	1	21.7	22.3	22.8
			3	1	1	1	22.5	22.1	22.5
			3	3	1	0	22.1	22.2	23.0
			6	0	2	2	21.3	20.9	21.2

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 5 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm) Max. Power		
						829 MHz	836.5 MHz	844 MHz
10	QPSK	1	0	0	0	23.2	23.5	23.2
		1	25	0	0	23.3	23.0	23.3
		1	49	0	0	23.3	23.5	23.2
		25	0	1	1	22.2	22.4	22.5
		25	12	1	1	22.2	22.3	22.4
		25	25	1	1	22.3	22.2	22.4
		50	0	1	1	22.3	22.2	22.4
	16QAM	1	0	1	0	22.4	23.6	22.7
		1	25	1	1	22.9	22.6	22.1
		1	49	1	1	23.0	22.8	22.6
		25	0	2	2	21.1	21.4	21.5
		25	12	2	2	21.2	21.2	21.5
		25	25	2	2	21.1	21.2	21.3
		50	0	2	2	21.1	21.2	21.3

BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm) Max. Power		
						826.5 MHz	836.5 MHz	846.5 MHz
5	QPSK	1	0	0	0	22.9	23.2	23.2
		1	12	0	0	23.4	23.2	23.5
		1	24	0	0	23.1	23.0	23.1
		12	0	1	1	22.2	22.3	22.3
		12	7	1	1	22.1	22.2	22.2
		12	13	1	1	22.2	22.1	22.3
		25	0	1	1	22.1	22.1	22.3
	16QAM	1	0	1	1	21.5	22.4	22.4
		1	12	1	1	21.9	22.2	21.9
		1	24	1	1	22.9	22.3	21.5
		12	0	2	2	21.1	21.3	21.0
		12	7	2	2	21.1	21.1	21.1
		12	13	2	2	21.2	21.1	21.2
		25	0	2	2	21.1	21.1	21.3

BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm) Max. Power		
						825.5 MHz	836.5 MHz	847.5 MHz
3	QPSK	1	0	0	0	23.1	23.5	23.2
		1	8	0	0	23.1	23.3	23.2
		1	14	0	0	23.1	23.3	23.1
		8	0	1	1	22.2	22.2	22.3
		8	4	1	1	22.2	22.2	22.4
		8	7	1	1	22.2	22.1	22.3
		15	0	1	1	22.2	22.1	22.3
	16QAM	1	0	1	0	22.3	22.6	23.3
		1	8	1	0	22.3	22.5	23.1
		1	14	1	0	22.3	23.1	23.2
		8	0	2	2	21.1	20.8	21.3
		8	4	2	2	21.2	20.8	21.2
		8	7	2	2	21.3	20.6	21.2
		15	0	2	2	21.1	21.3	21.1

BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm) Max. Power		
						824.7 MHz	836.5 MHz	848.3 MHz
1.4	QPSK	1	0	0	1	23.2	23.4	23.1
		1	3	0	1	23.0	23.2	23.2
		1	5	0	1	23.2	23.0	23.2
		3	0	0	1	23.2	23.1	23.0
		3	1	0	1	23.3	23.1	23.2
		3	3	0	1	23.2	23.1	23.1
		6	0	1	2	22.0	22.2	22.1
	16QAM	1	0	1	0	21.8	24.0	23.4
		1	3	1	0	21.8	22.2	23.7
		1	5	1	1	21.9	22.3	22.9
		3	0	1	2	22.4	21.7	21.9
		3	1	1	2	21.9	22.3	22.3
		3	3	1	2	22.2	21.7	22.4
		6	0	2	3	20.8	20.6	20.8

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE Band 17 Measured Results

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm) Max. Power 710 MHz
LTE Band 17	10	QPSK	1	0	0	0	22.9
			1	25	0	0	22.8
			1	49	0	0	22.7
			25	0	1	2	20.6
			25	12	1	2	20.5
			25	25	1	2	20.5
			50	0	1	2	20.5
		16QAM	1	0	1	0	22.5
			1	25	1	0	22.4
			1	49	1	0	22.5
			25	0	2	3	19.6
			25	12	2	3	19.6
			25	25	2	3	19.5
			50	0	2	3	19.4

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm) Max. Power 710 MHz
LTE Band 17	5	QPSK	1	0	0	0	22.8
			1	12	0	0	22.8
			1	24	0	0	22.6
			12	0	1	1	22.0
			12	6	1	1	22.0
			12	11	1	1	22.0
			25	0	1	1	22.0
		16QAM	1	0	1	1	21.9
			1	12	1	1	22.0
			1	24	1	1	21.7
			12	0	2	2	21.1
			12	6	2	2	21.1
			12	11	2	2	21.1
			25	0	2	2	21.0

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

9. PEAK TO AVERAGE RATIO

Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v02r02;

The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The PAR were measured on the Spectrum Analyzer.

Test Spec

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

9.1. CONDUCTED PEAK TO AVERAGE RESULT

GSM

Band	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
GSM850	190	836.6	GPRS	2.78	13.00
			EGPRS	5.78	
GSM1900	661	1880.0	GPRS	2.85	
			EGPRS	5.75	

WCDMA

Band	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
Band 5	4183	836.6	REL99	2.75	13.00
			HSDPA	2.92	
Band 2	9400	1880.0	REL99	2.97	
			HSDPA	3.09	
Band 4	1413	1732.6	REL99	2.99	
			HSDPA	3.13	

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

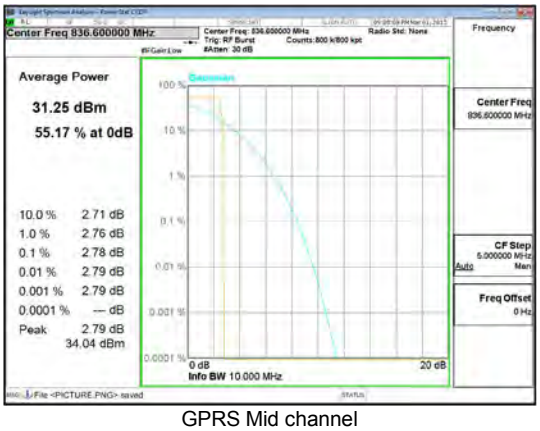
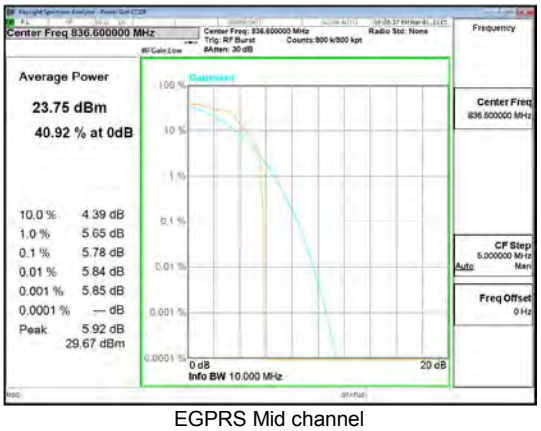
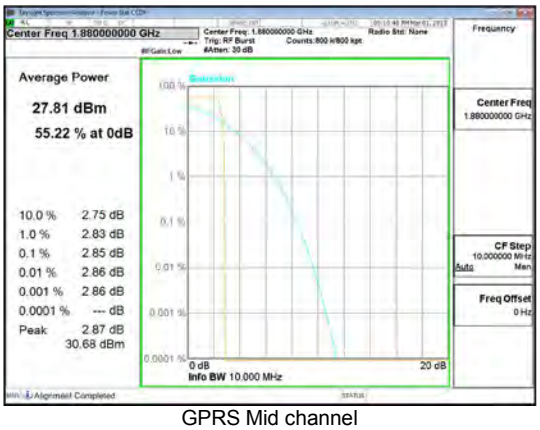
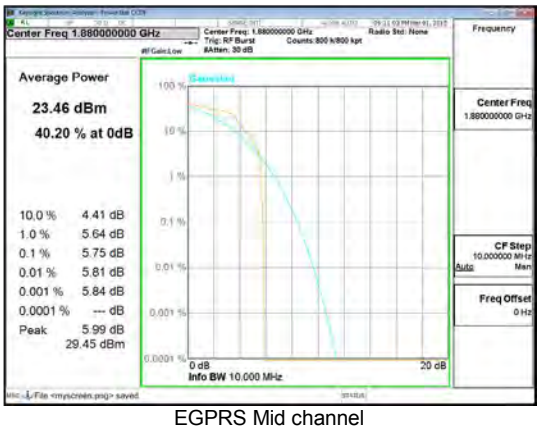
LTE

Band	BW [MHz]	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
Band 2	20	18900	1880.0	QPSK	6.04	13.00
				16QAM	6.91	
	15			QPSK	5.24	
				16QAM	6.36	
	10			QPSK	5.26	
				16QAM	5.93	
	5			QPSK	5.11	
				16QAM	5.87	
	3			QPSK	5.17	
				16QAM	6.07	
	1.4			QPSK	4.55	
				16QAM	5.90	
Band 4	20	20174	1732.5	QPSK	6.02	
				16QAM	6.94	
	15			QPSK	5.25	
				16QAM	6.40	
	10			QPSK	5.21	
				16QAM	5.98	
	5			QPSK	5.15	
				16QAM	6.01	
	3			QPSK	5.09	
				16QAM	6.07	
	1.4			QPSK	4.72	
				16QAM	5.92	

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

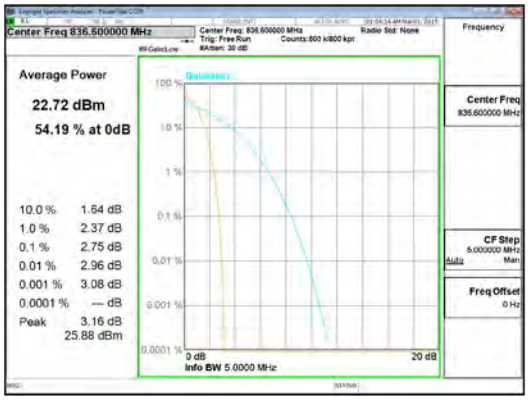
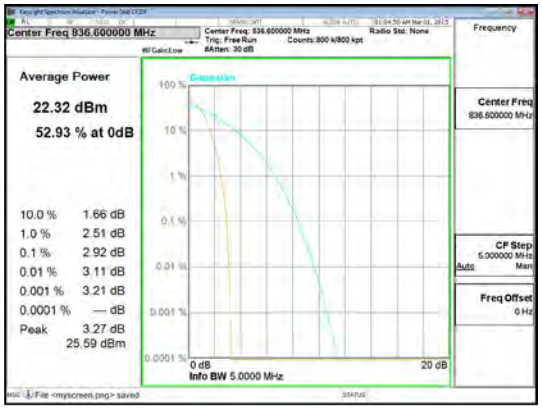
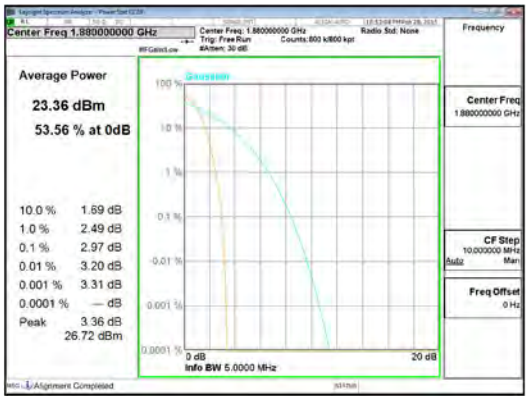
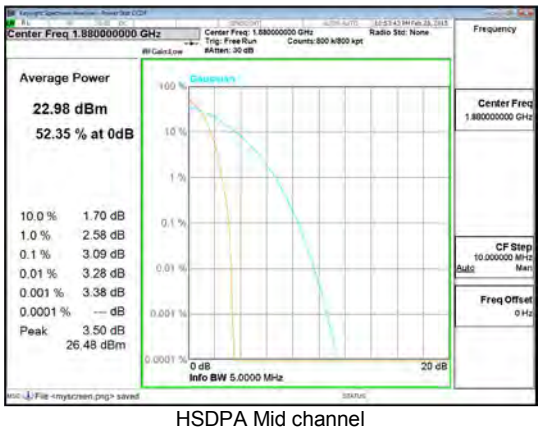
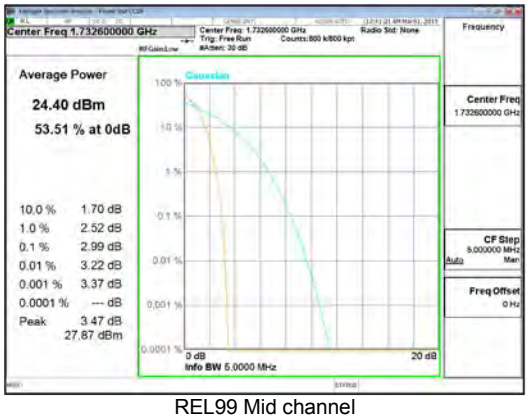
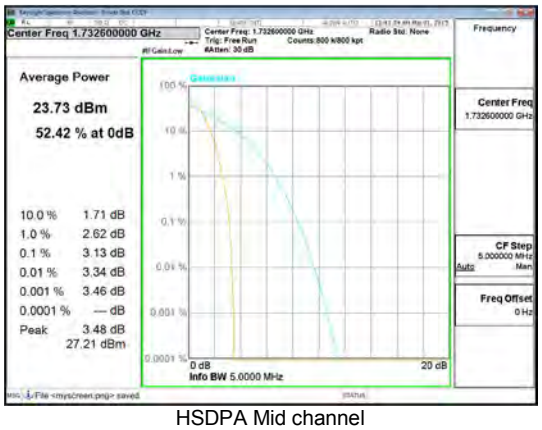
9.2. CONDUCTED PEAK TO AVERAGE PLOTS

GSM

Band 850	 GPRS Mid channel	 EGPRS Mid channel
Band 1900	 GPRS Mid channel	 EGPRS Mid channel

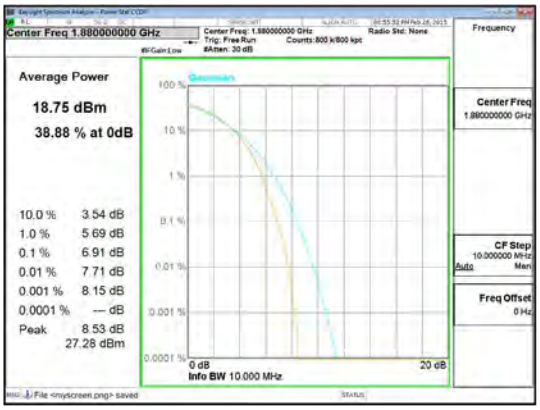
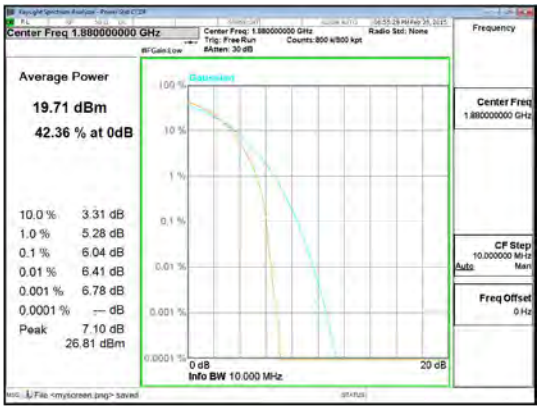
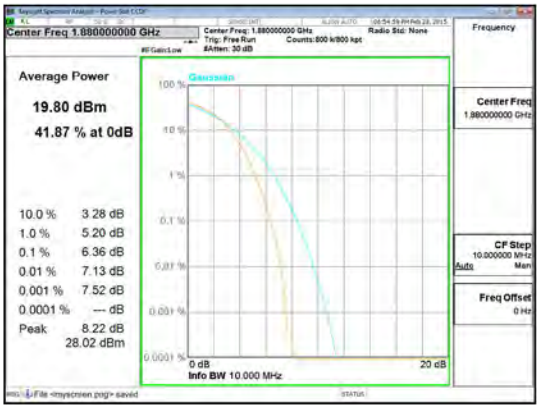
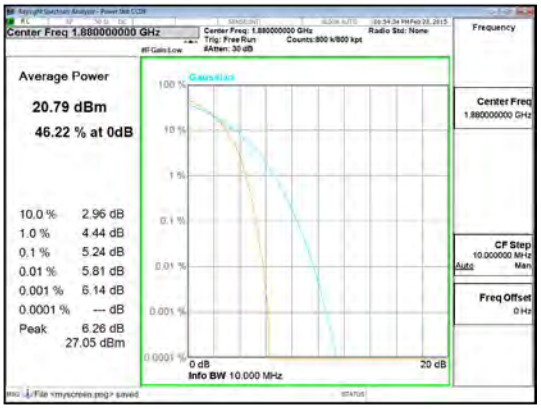
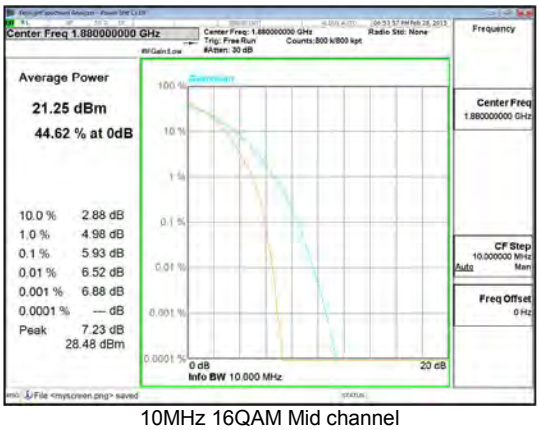
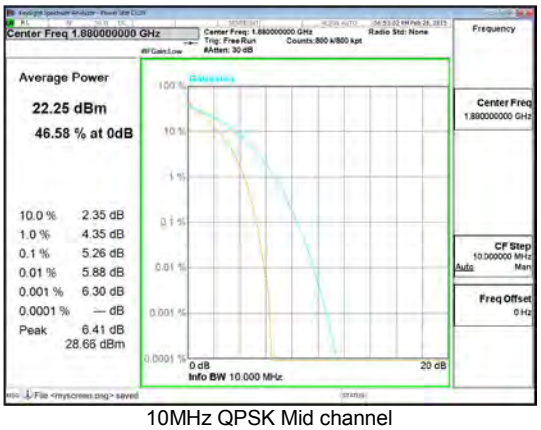
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA

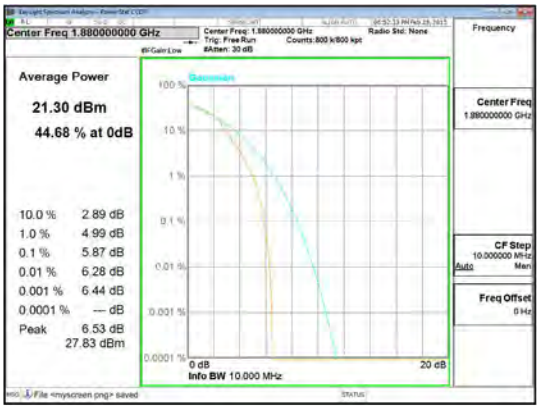
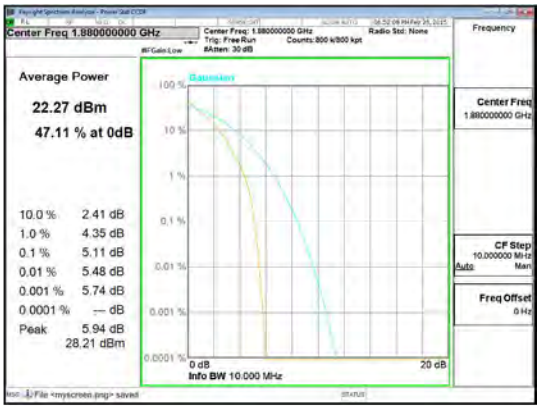
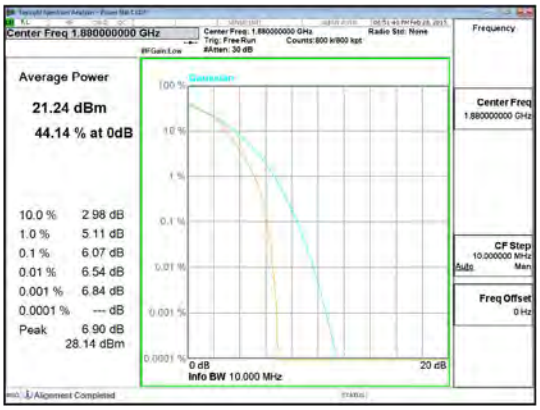
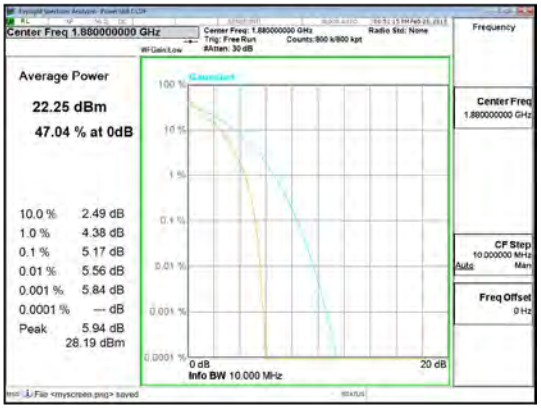
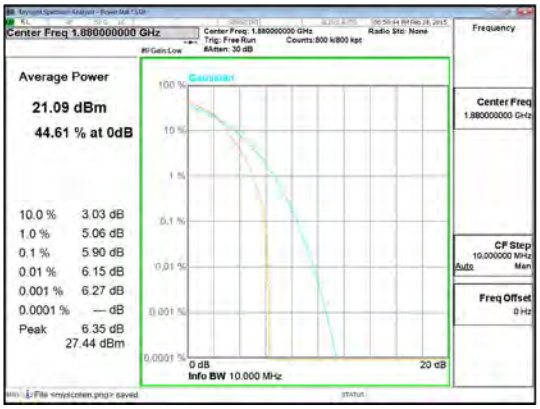
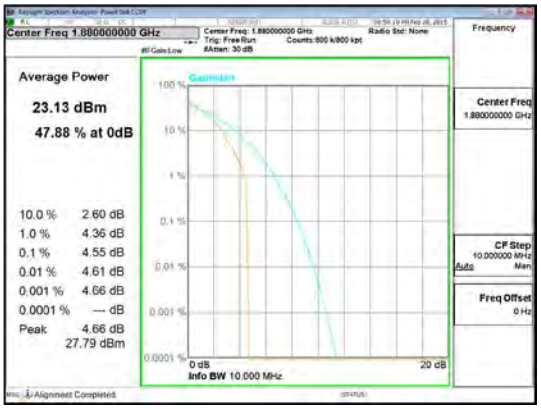
Band 5	 REL99 Mid channel	 HSDPA Mid channel
Band 2	 REL99 Mid channel	 HSDPA Mid channel
Band 4	 REL99 Mid channel	 HSDPA Mid channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

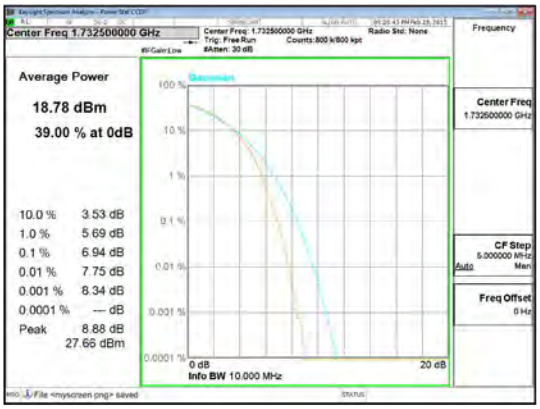
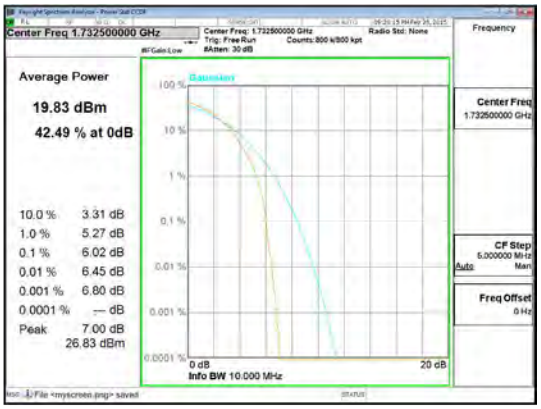
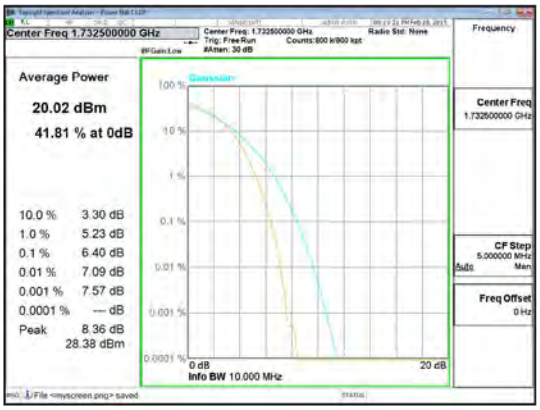
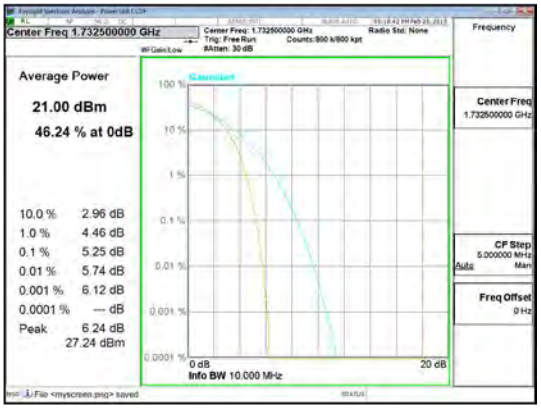
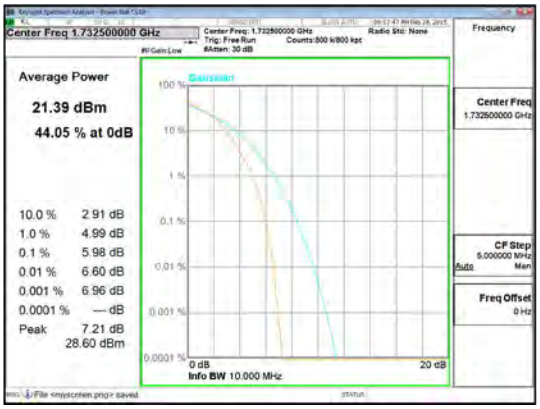
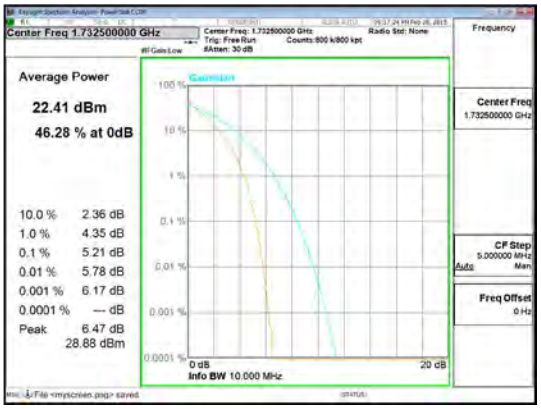
LTE

LTE 2	 20MHz 16QAM Mid channel	 20MHz QPSK Mid channel
LTE 2	 15MHz 16QAM Mid channel	 15MHz QPSK Mid channel
LTE 2	 10MHz 16QAM Mid channel	 10MHz QPSK Mid channel

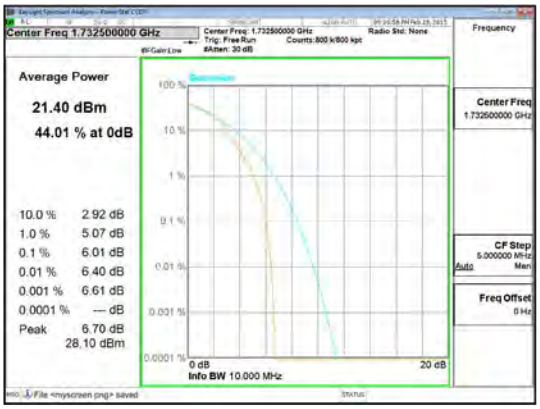
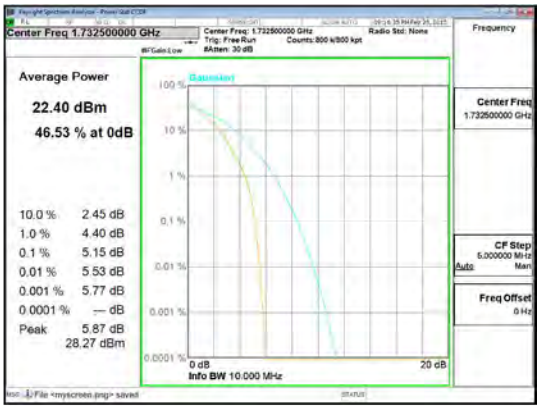
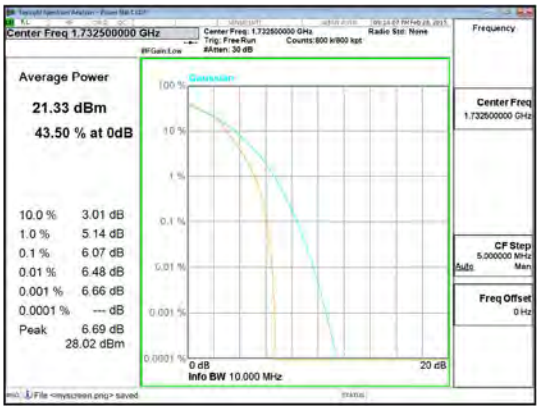
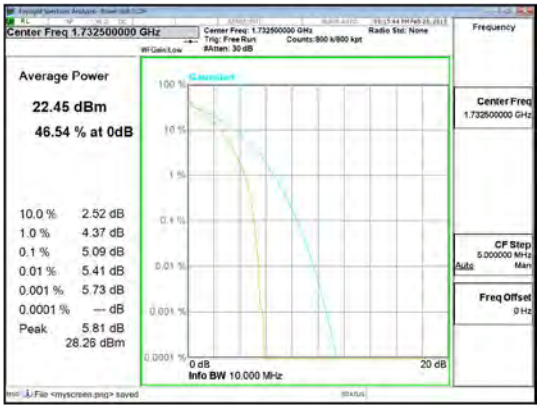
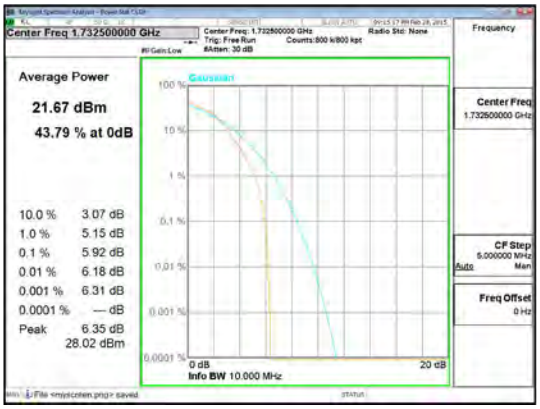
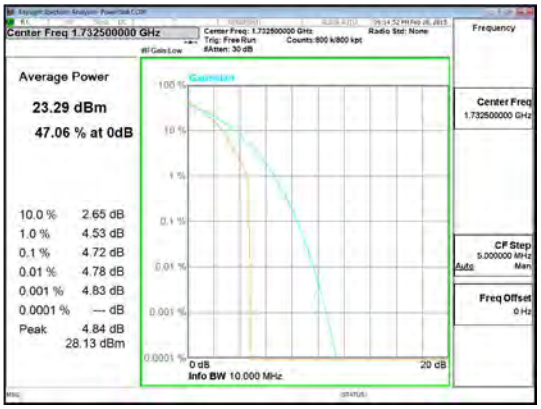
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE 2	 5MHz 16QAM Mid channel	 5MHz QPSK Mid channel
LTE 2	 3MHz 16QAM Mid channel	 3MHz QPSK Mid channel
LTE 2	 1.4MHz 16QAM Mid channel	 1.4MHz QPSK Mid channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE 4	 20MHz 16QAM Mid channel	 20MHz QPSK Mid channel
LTE 4	 15MHz 16QAM Mid channel	 15MHz QPSK Mid channel
LTE 4	 10MHz 16QAM Mid channel	 10MHz QPSK Mid channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE 4	 5MHz 16QAM Mid channel	 5MHz QPSK Mid channel
LTE 4	 3MHz 16QAM Mid channel	 3MHz QPSK Mid channel
LTE 4	 1.4MHz 16QAM Mid channel	 1.4MHz QPSK Mid channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

10. LIMITS AND CONDUCTED RESULTS

10.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

(KDB 971168 D01 Power Meas License Digital Systems v02r02)

10.1.1. OCCUPIED BANDWIDTH RESULTS

GSM

Band	Mode	Channel	f [MHz]	99% BW [KHz]	26dB BW [KHz]
GSM850	GPRS	128	824.2	244.2	308.4
		190	836.6	248.6	317.4
		251	848.8	242.3	315.9
	EGPRS	128	824.2	234.8	311.7
		190	836.6	249.2	303.5
		251	848.8	257.6	309.0
GSM1900	GPRS	512	1850.2	243.6	318.8
		661	1880.0	243.1	317.9
		810	1909.8	242.2	321.3
	EGPRS	512	1850.2	239.3	301.2
		661	1880.0	243.0	310.5
		810	1909.8	255.3	314.6

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA

Band	Mode	Channel	f [MHz]	99% BW [MHz]	26dB BW [MHz]
Band 5	REL99	4132	826.4	4.174	4.638
		4183	836.6	4.154	4.655
		4233	846.6	4.158	4.639
	HSDPA	4132	826.4	4.166	4.630
		4183	836.6	4.160	4.640
		4233	846.6	4.156	4.630
Band 2	REL99	9262	1852.4	4.176	4.656
		9400	1880.0	4.167	4.655
		9538	1907.6	4.177	4.647
	HSDPA	9262	1852.4	4.190	4.638
		9400	1880.0	4.180	4.633
		9538	1907.6	4.173	4.634
Band 4	REL99	1312	1712.4	4.171	4.641
		1413	1732.6	4.163	4.641
		1513	1752.6	4.173	4.646
	HSDPA	1312	1712.4	4.172	4.629
		1413	1732.6	4.192	4.635
		1513	1752.6	4.185	4.633

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band	BW(MHz)	Channel	f [MHz]	Mode	99% BW [MHz]	26dB BW [MHz]
Band 2	1.4	18607	1850.7	QPSK	1.086	1.278
				16QAM	1.084	1.287
		18900	1880.0	QPSK	1.080	1.283
				16QAM	1.086	1.290
		19192	1909.3	QPSK	1.087	1.289
				16QAM	1.093	1.294
	3	18615	1815.5	QPSK	2.698	2.992
				16QAM	2.692	2.990
		18900	1880.0	QPSK	2.694	2.959
				16QAM	2.700	2.972
		19184	1908.5	QPSK	2.695	2.973
				16QAM	2.695	2.967
	5	18625	1852.5	QPSK	4.495	4.944
				16QAM	4.499	4.976
		18900	1880.0	QPSK	4.501	5.002
				16QAM	4.500	4.980
		18175	1907.5	QPSK	4.496	4.937
				16QAM	4.499	4.975
	10	18650	1855.0	QPSK	8.968	9.914
				16QAM	8.974	9.880
		18900	1880.0	QPSK	8.974	9.866
				16QAM	8.948	9.831
		19149	1905.0	QPSK	8.949	9.868
				16QAM	8.964	9.888
	15	18675	1857.5	QPSK	13.415	14.616
				16QAM	13.424	14.562
		18900	1880.0	QPSK	13.437	14.627
				16QAM	13.434	14.677
		19124	1902.5	QPSK	13.421	14.641
				16QAM	13.430	14.623
	20	18700	1860.0	QPSK	17.887	19.304
				16QAM	17.859	19.290
		18900	1880.0	QPSK	17.913	19.377
				16QAM	17.907	19.330
		19099	1900.0	QPSK	17.878	19.438
				16QAM	17.870	19.390

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

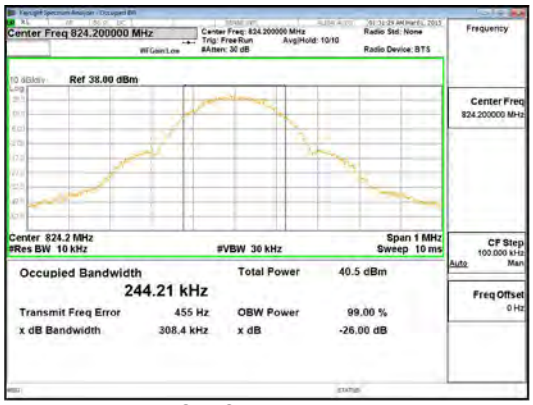
Band	BW(MHz)	Channel	f [MHz]	Mode	99% BW [MHz]	26dB BW [MHz]
Band 4	1.4	19957	1710.7	QPSK	1.081	1.273
				16QAM	1.085	1.279
		20174	1732.5	QPSK	1.085	1.276
				16QAM	1.096	1.298
		20392	1754.3	QPSK	1.086	1.279
				16QAM	1.083	1.286
	3	19965	1711.5	QPSK	2.693	2.961
				16QAM	2.700	2.962
		20174	1732.5	QPSK	2.696	2.981
				16QAM	2.694	2.980
		20384	1753.5	QPSK	2.698	2.971
				16QAM	2.691	2.986
	5	19975	1712.5	QPSK	4.498	4.938
				16QAM	4.503	4.974
		20174	1732.5	QPSK	4.499	5.006
				16QAM	4.499	4.982
		20374	1752.5	QPSK	4.491	4.946
				16QAM	4.502	4.986
	10	20000	1715.0	QPSK	8.986	9.817
				16QAM	8.983	9.939
		20174	1732.5	QPSK	8.982	9.803
				16QAM	8.943	9.804
		20349	1750.0	QPSK	8.977	9.798
				16QAM	8.966	9.841
	15	20025	1717.5	QPSK	13.447	14.653
				16QAM	13.457	14.572
		20174	1732.5	QPSK	13.446	14.658
				16QAM	13.443	14.471
		20324	1747.5	QPSK	13.420	14.524
				16QAM	13.406	14.600
	20	20050	1720.0	QPSK	17.902	19.236
				16QAM	17.922	19.333
		20174	1732.5	QPSK	17.871	18.704
				16QAM	17.891	19.330
		20299	1745.0	QPSK	17.861	19.342
				16QAM	17.843	19.312

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

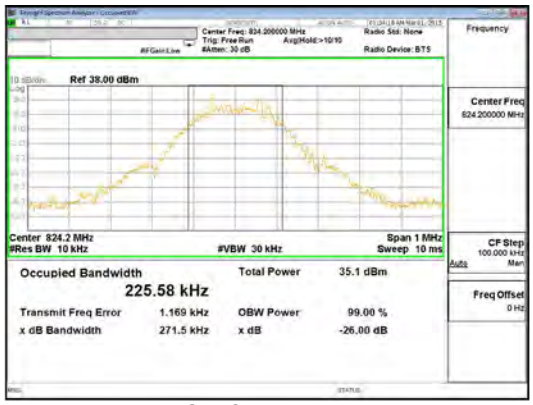
10.1.2. OCCUPIED BANDWIDTH PLOTS

GSM 850

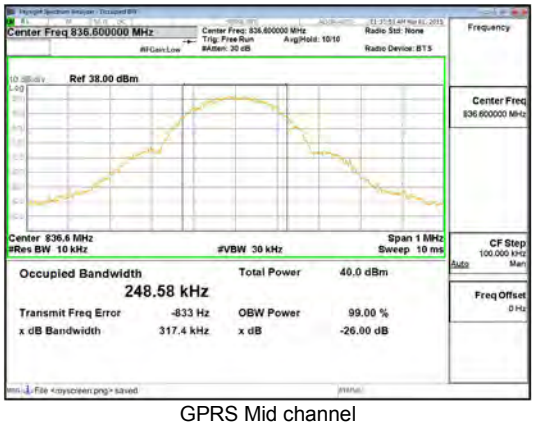
Band 850



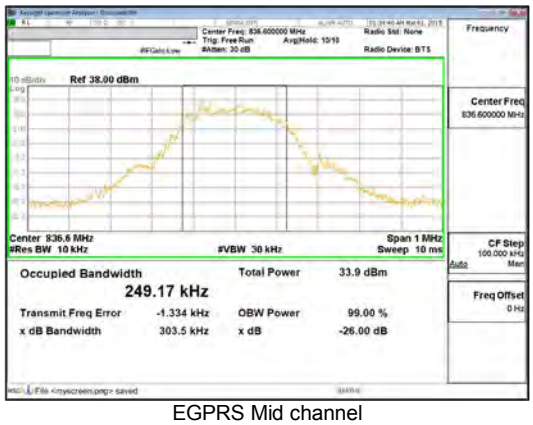
GPRS Low channel



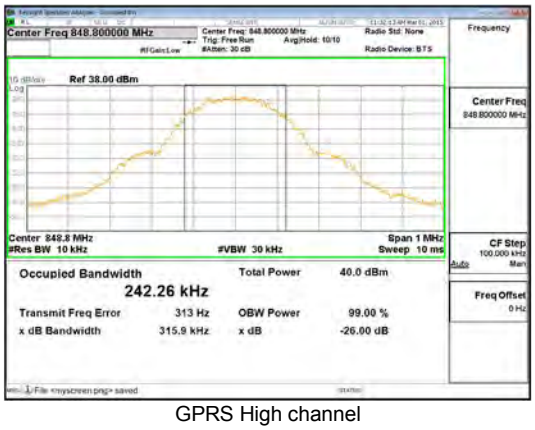
EGPRS Low channel



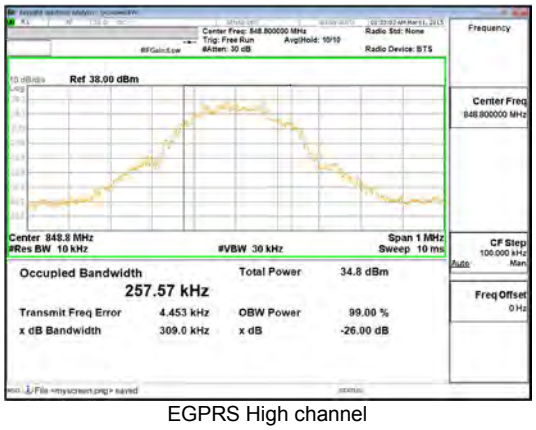
GPRS Mid channel



EGPRS Mid channel



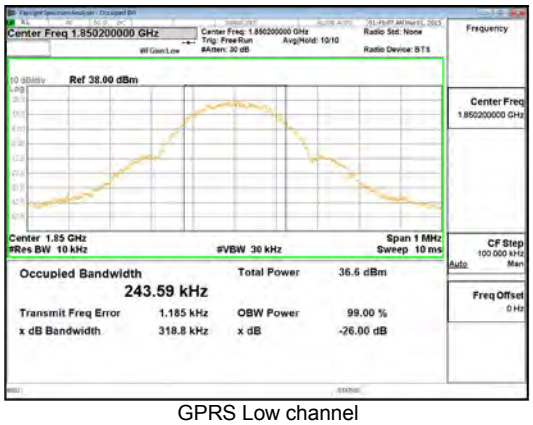
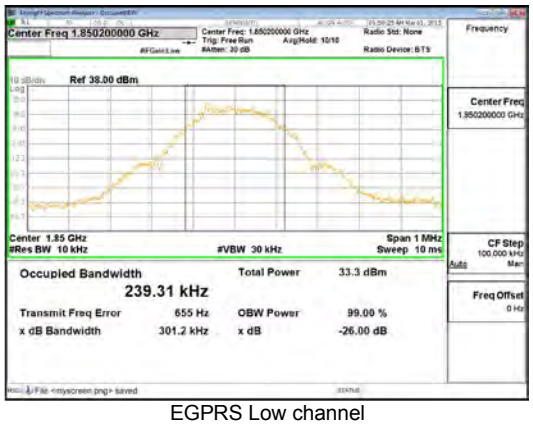
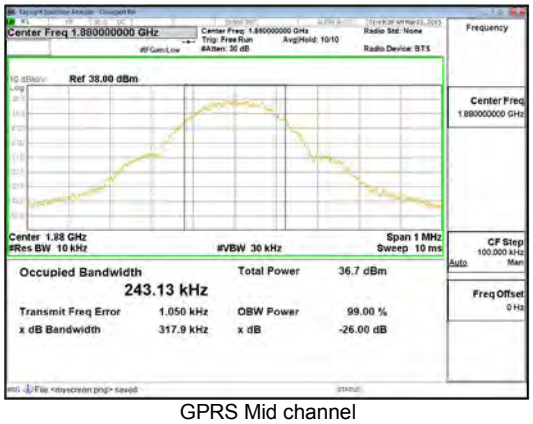
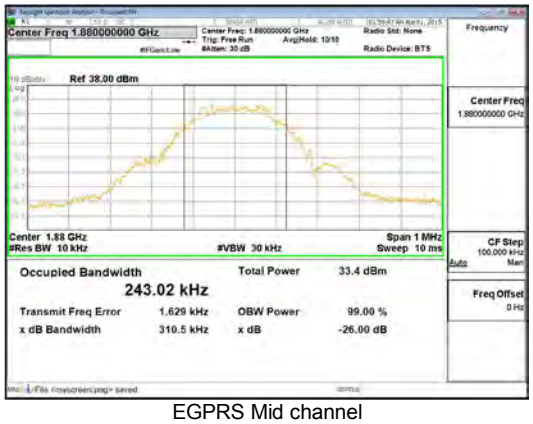
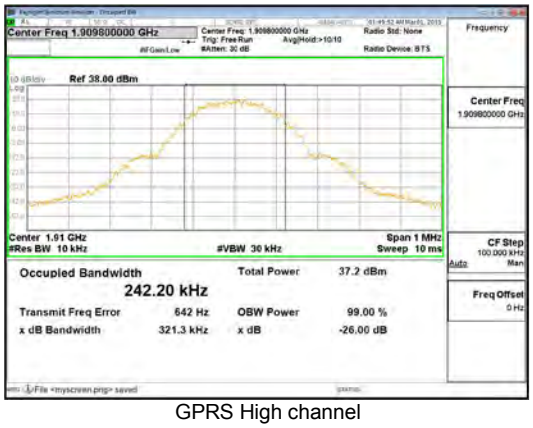
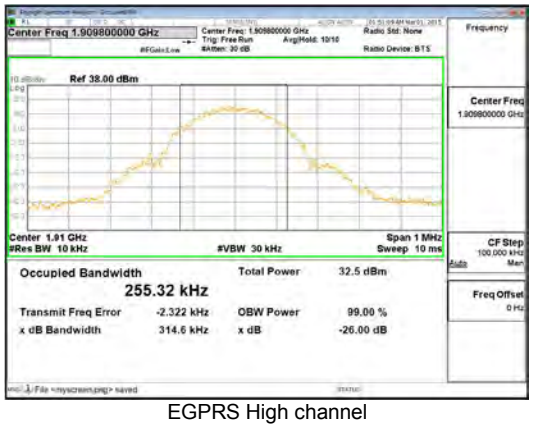
GPRS High channel



EGPRS High channel

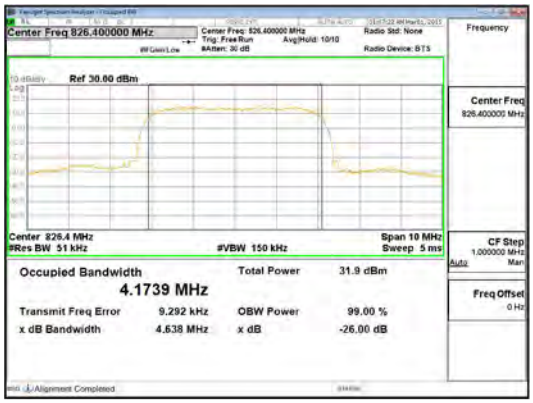
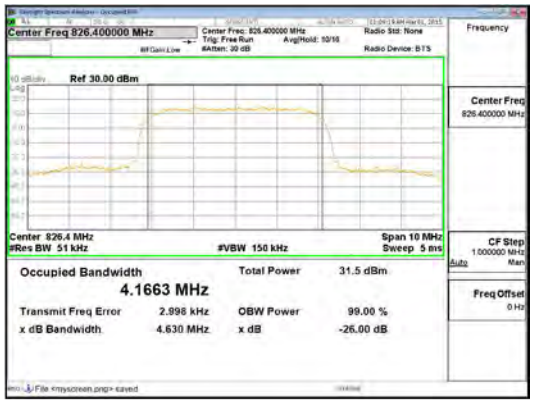
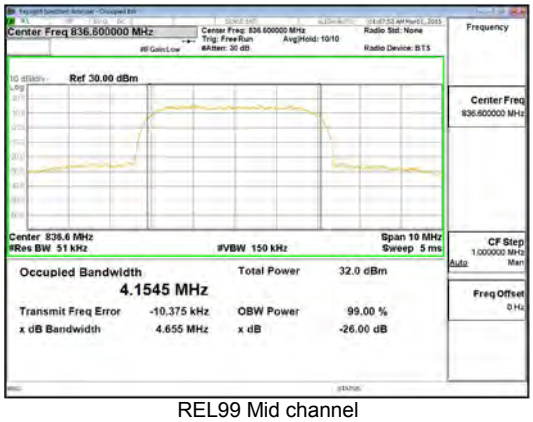
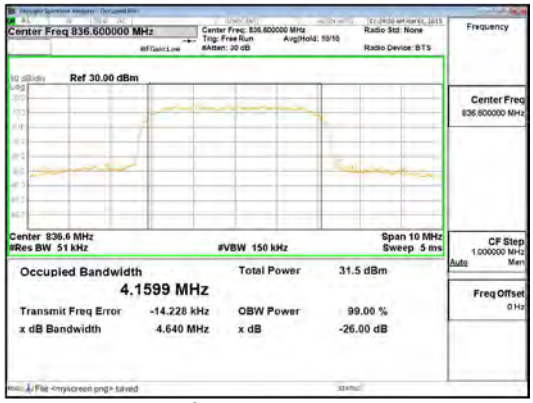
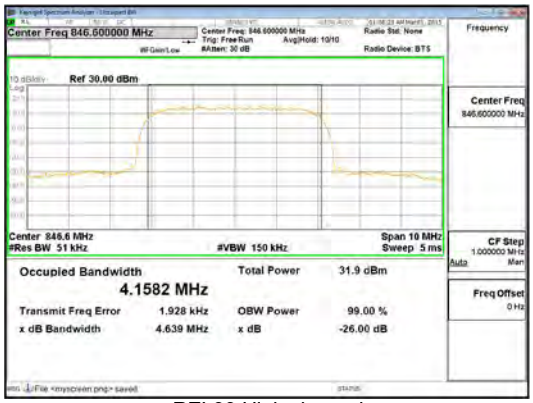
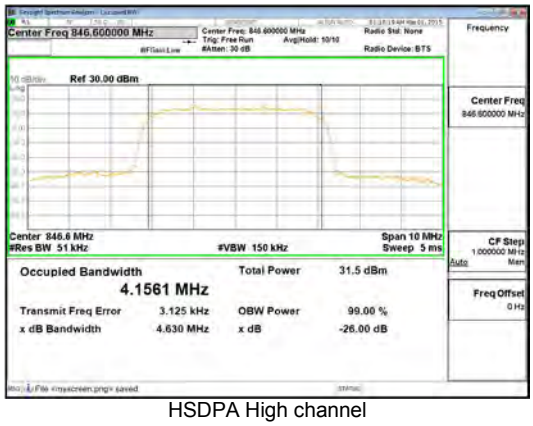
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

GSM 1900

Band 1900	 GPRS Low channel	 EGPRS Low channel
	 GPRS Mid channel	 EGPRS Mid channel
	 GPRS High channel	 EGPRS High channel

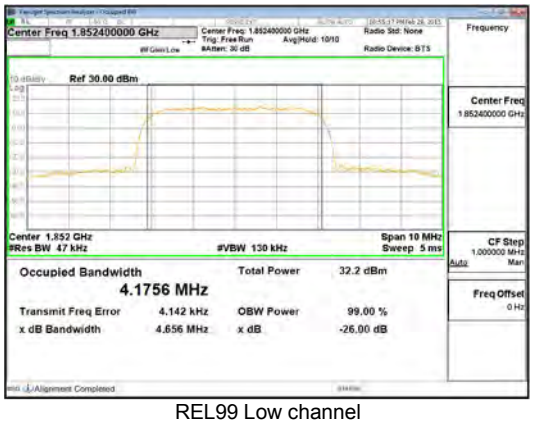
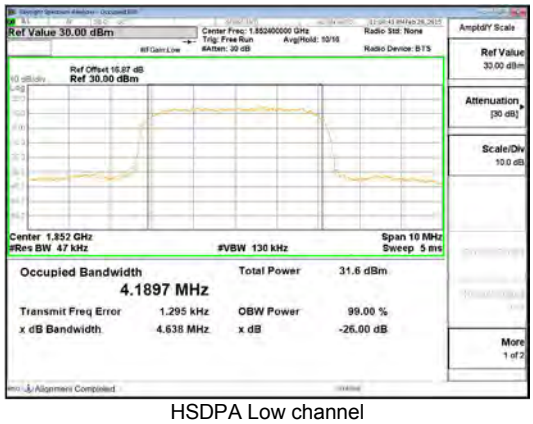
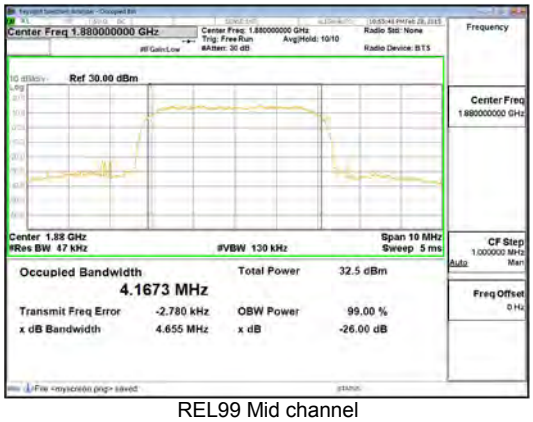
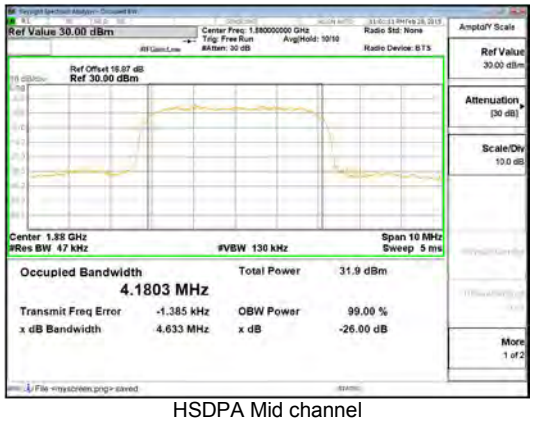
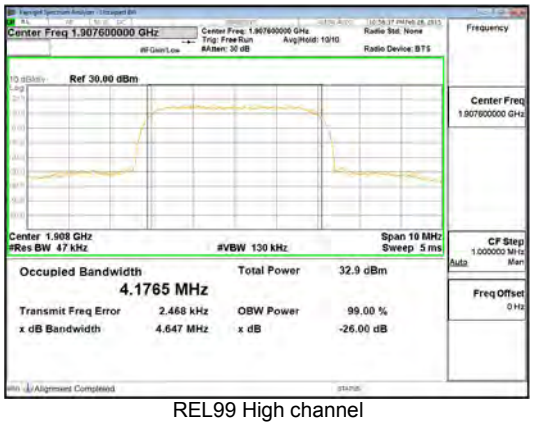
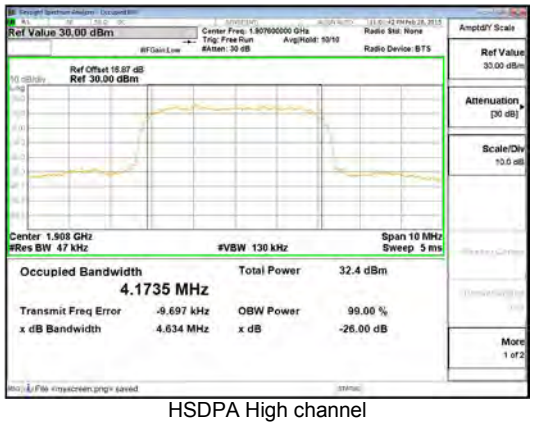
UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 5

Band 5	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

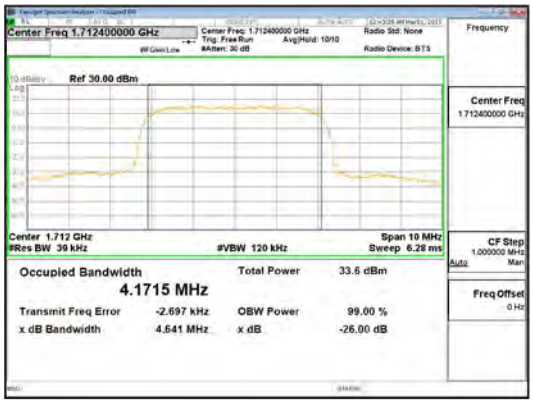
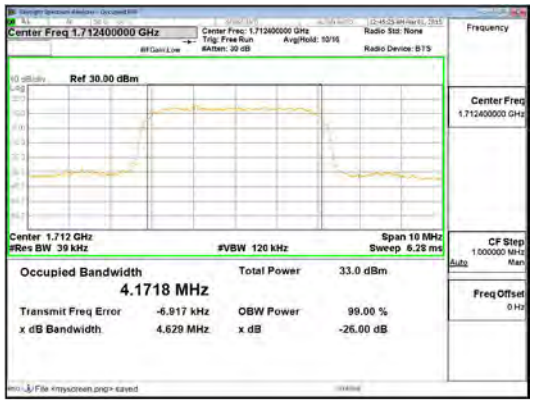
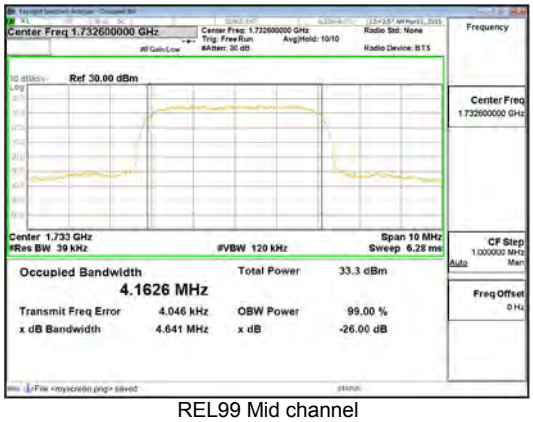
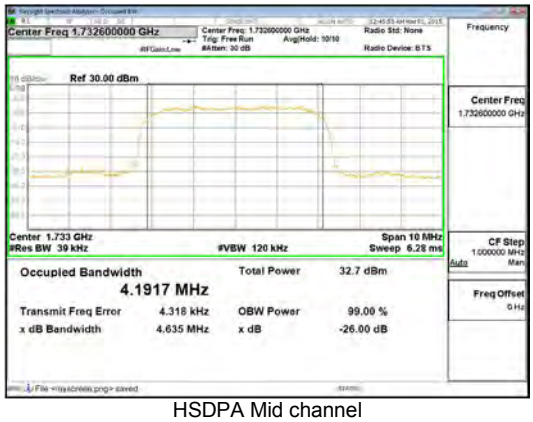
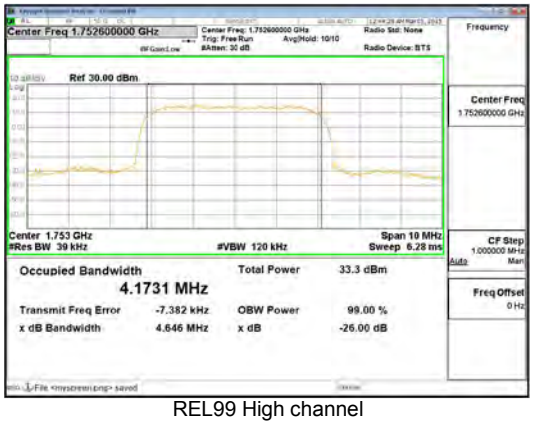
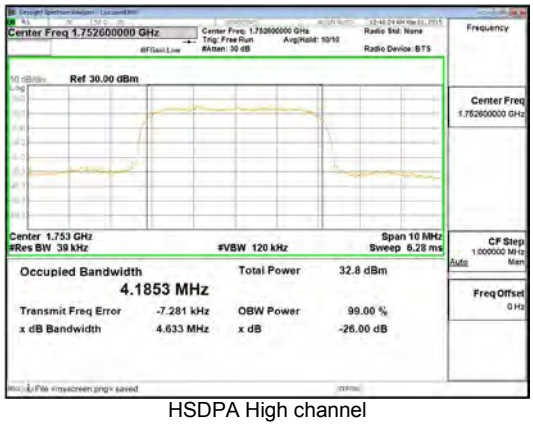
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 2

Band 2	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

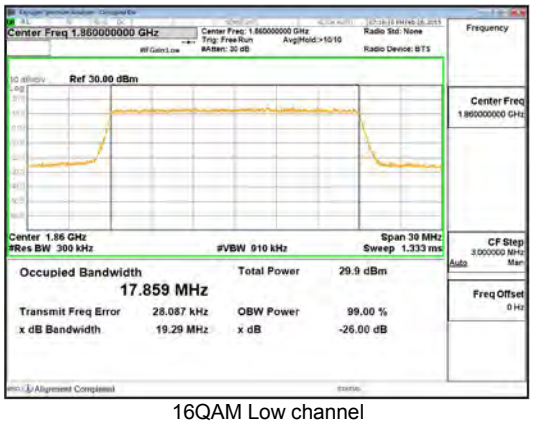
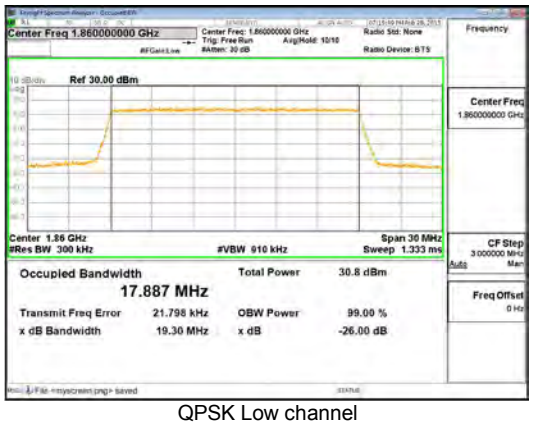
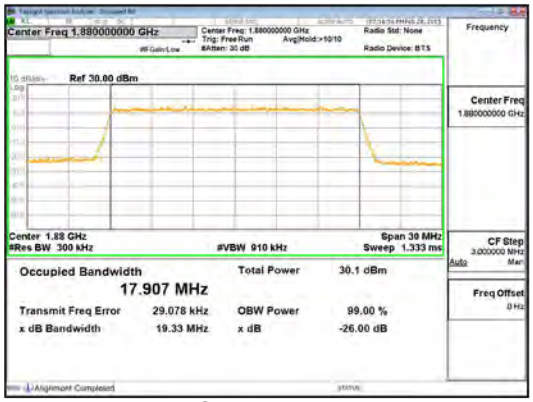
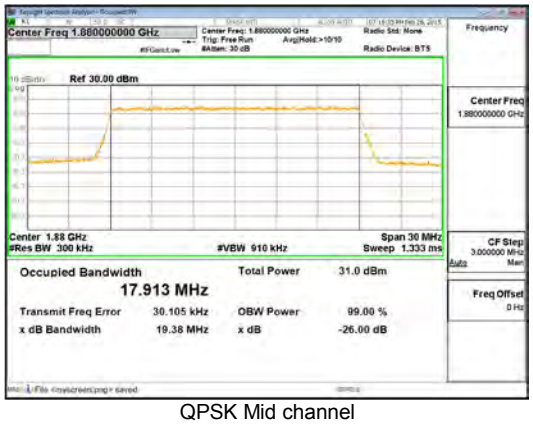
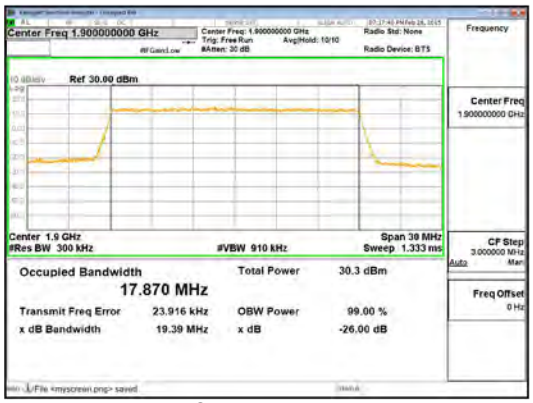
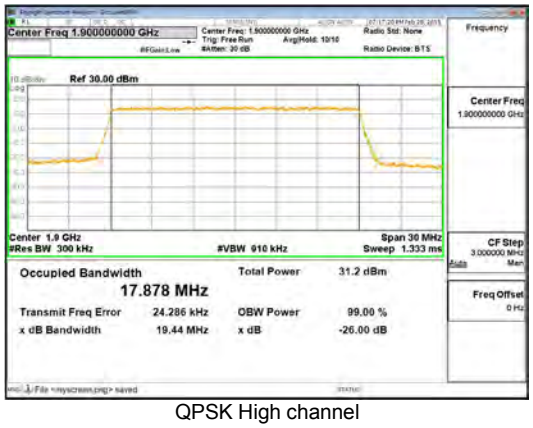
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 4

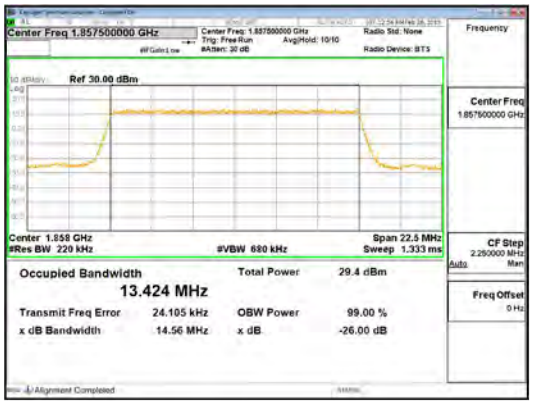
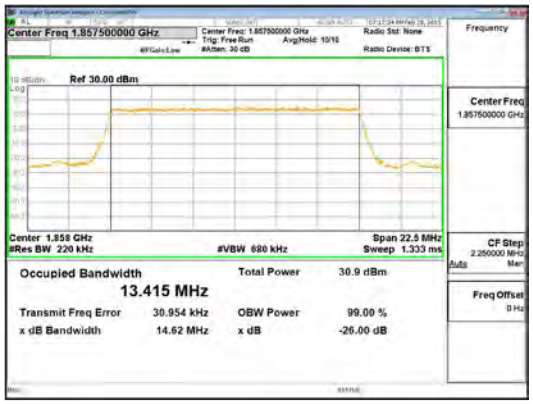
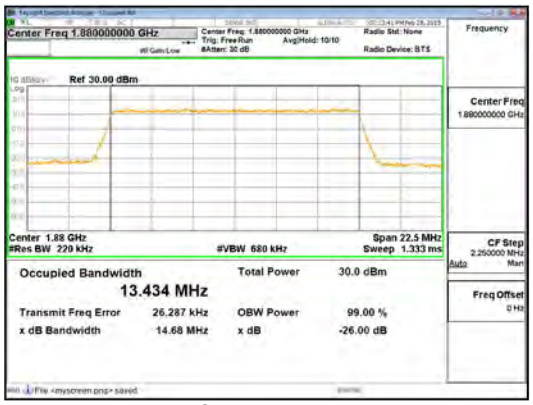
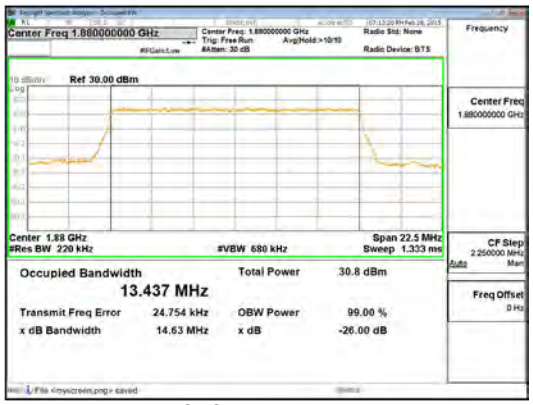
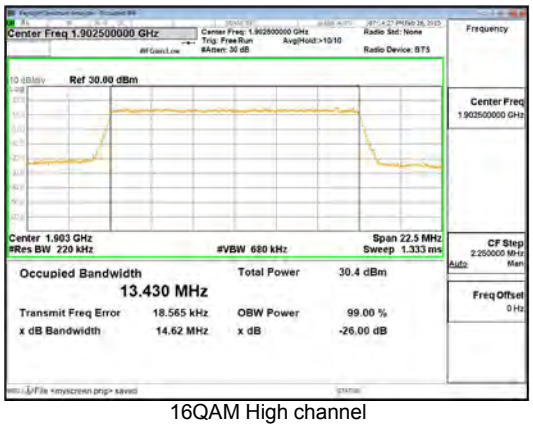
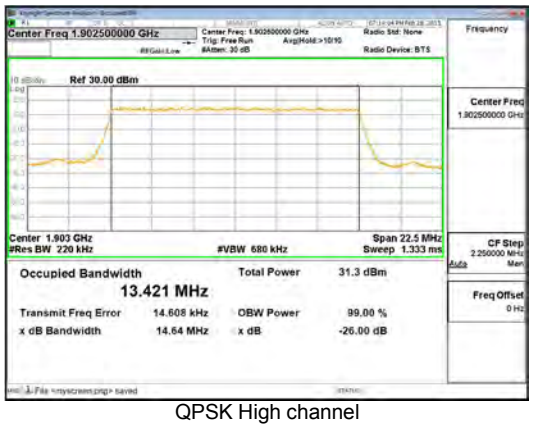
Band 4	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

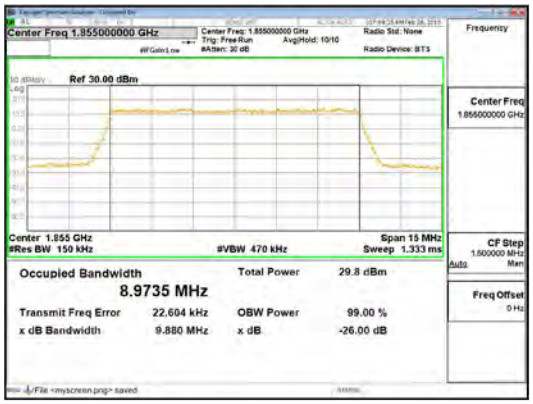
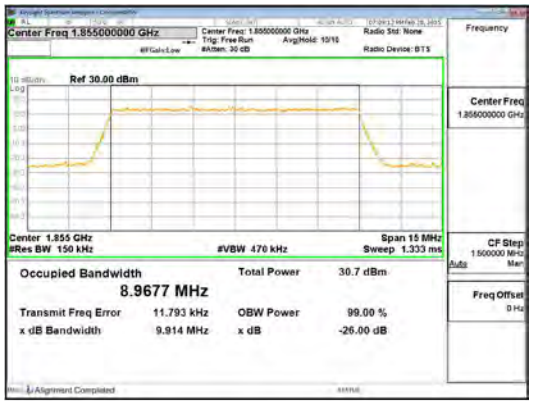
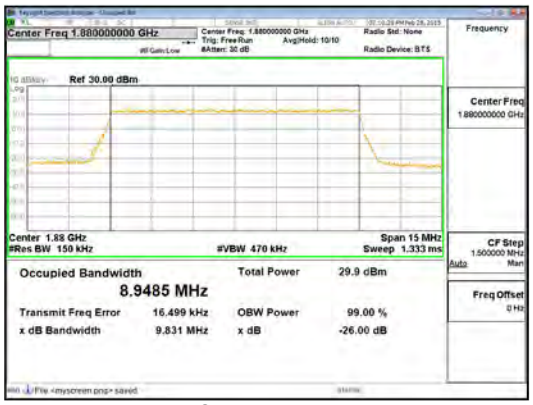
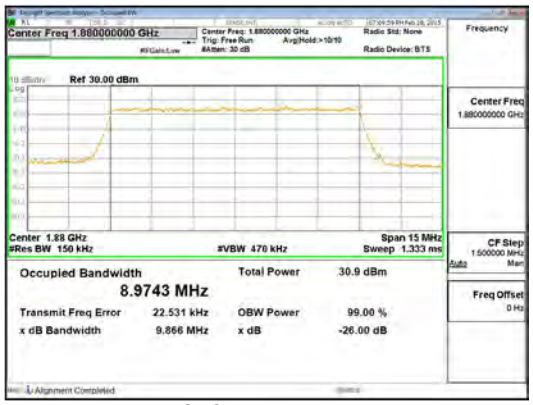
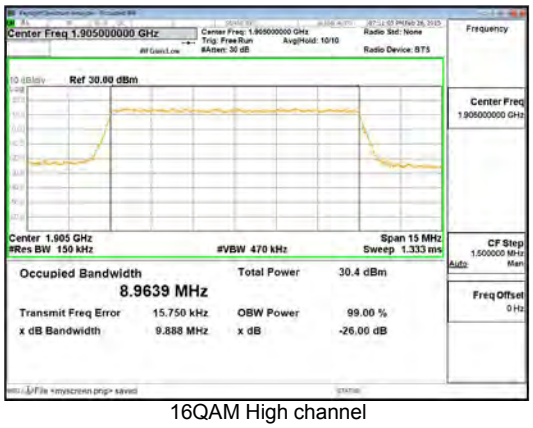
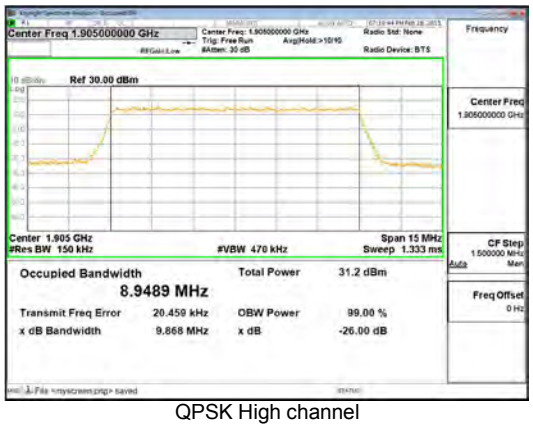
LTE Band 2

Band 2 20MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

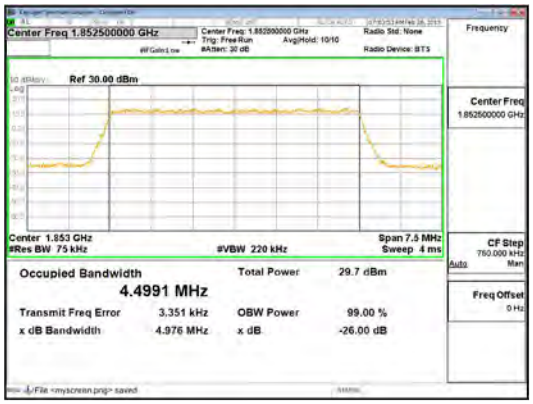
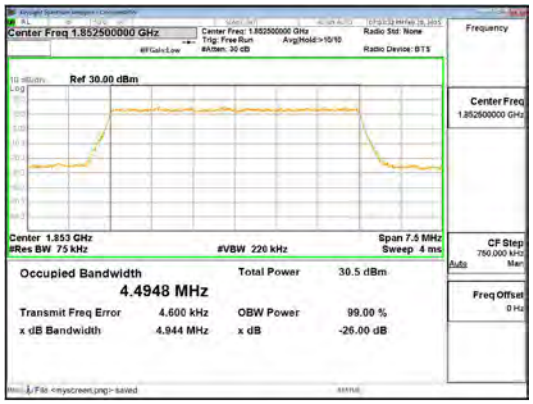
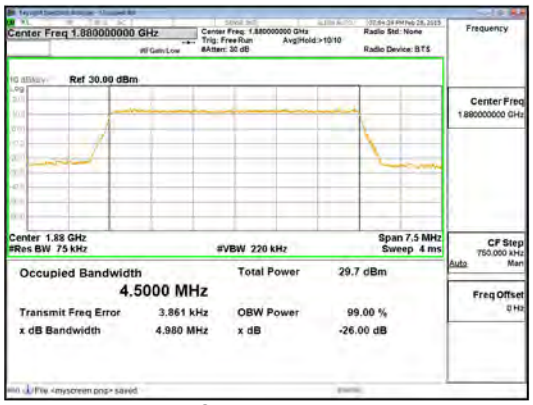
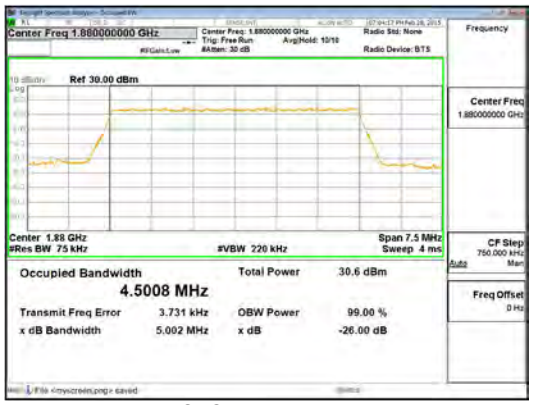
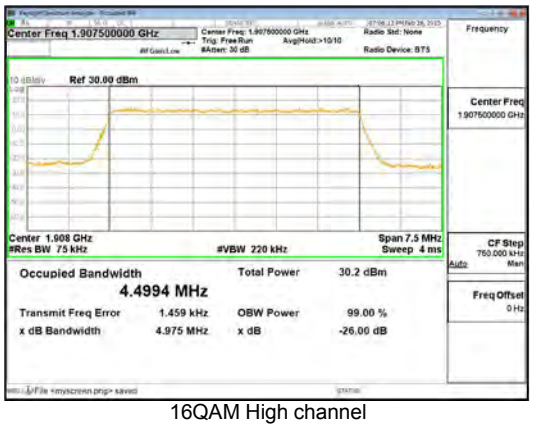
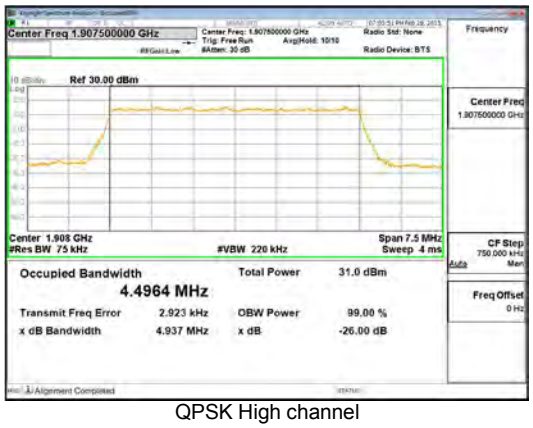
UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 2 15MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

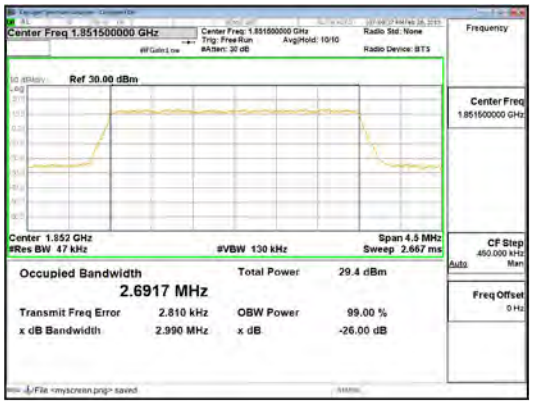
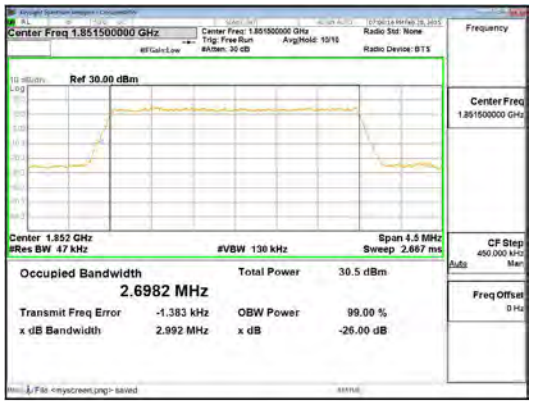
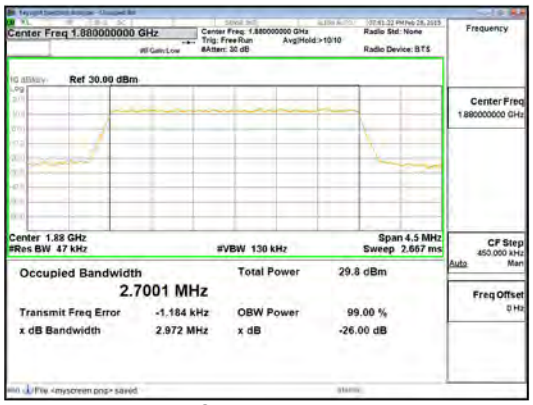
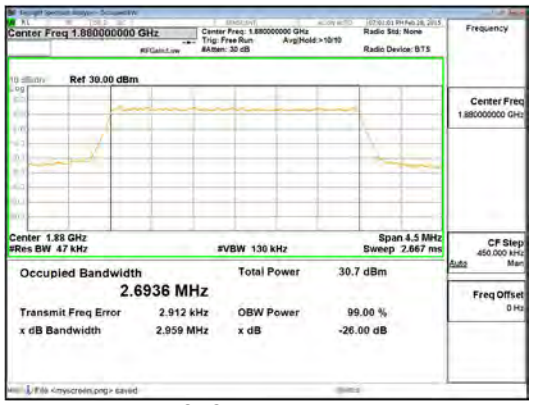
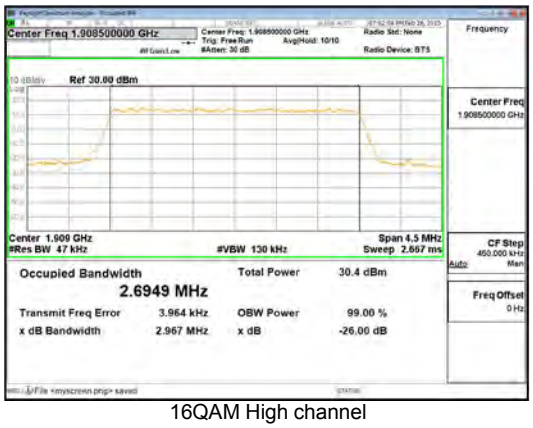
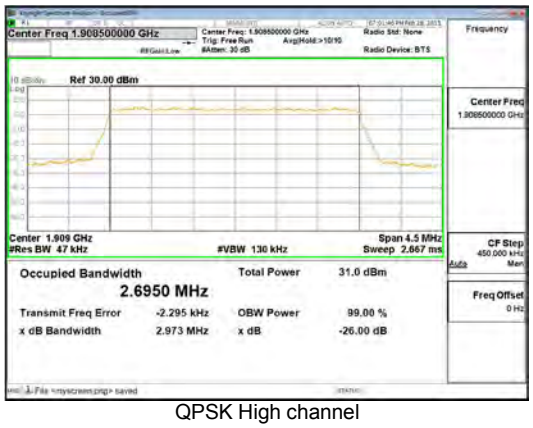
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 2 10MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

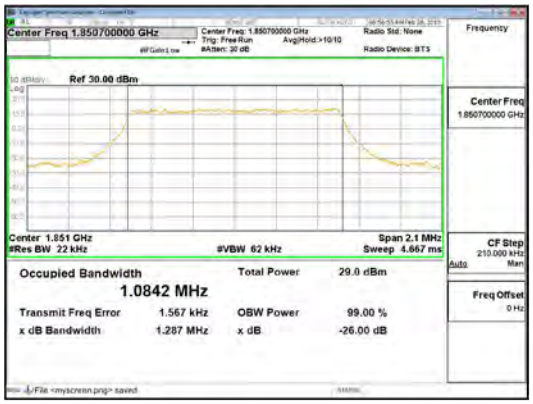
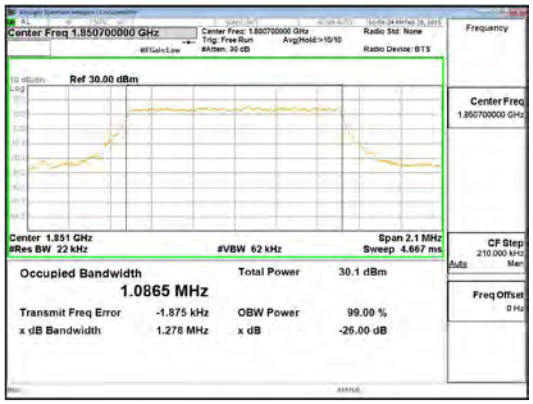
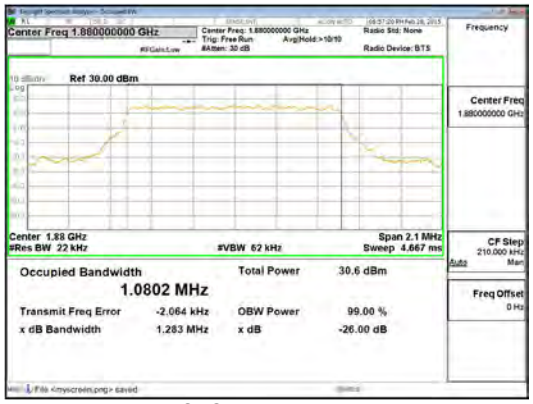
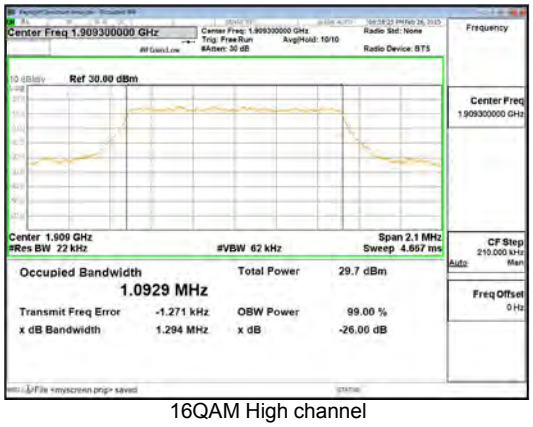
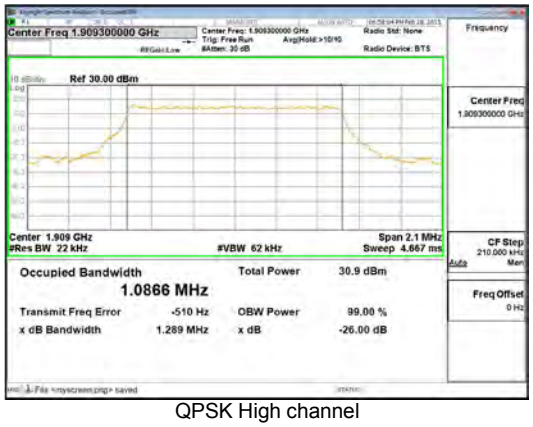
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 2 5MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

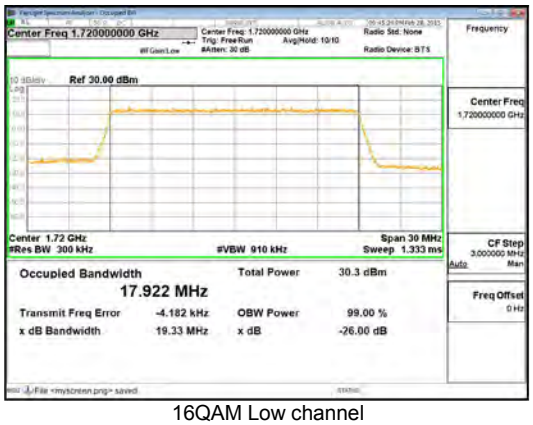
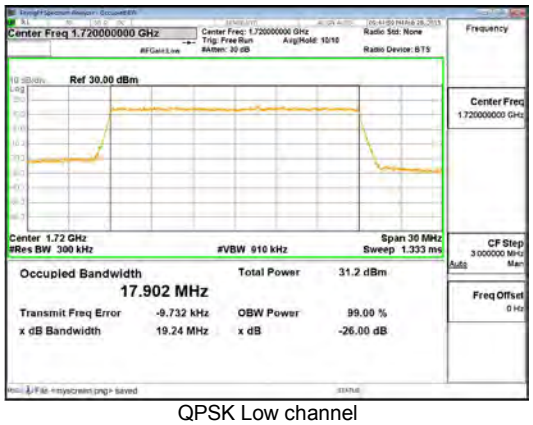
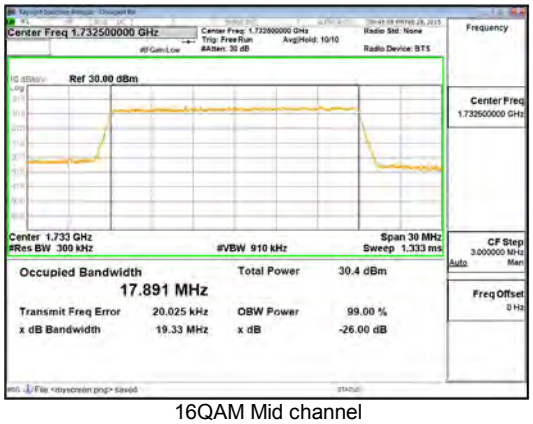
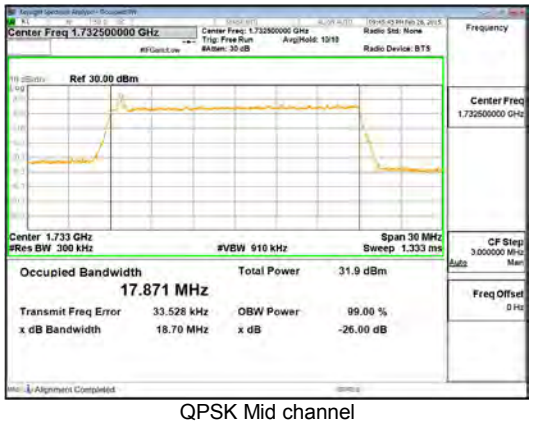
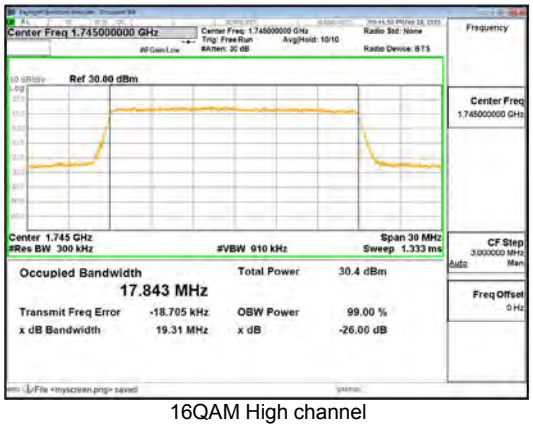
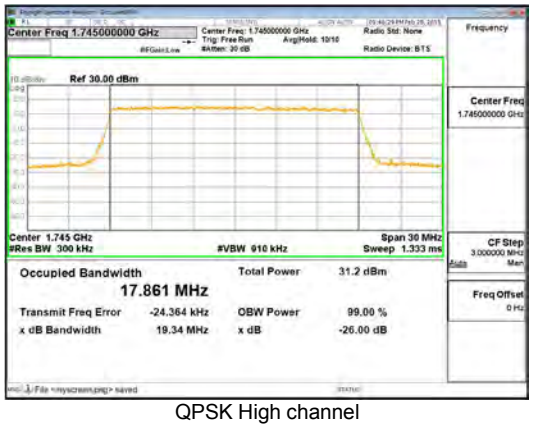
Band 2 3MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

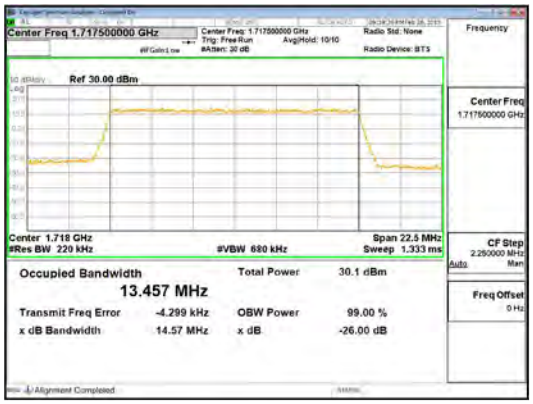
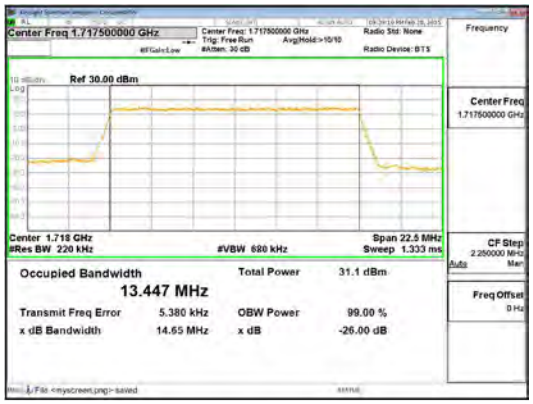
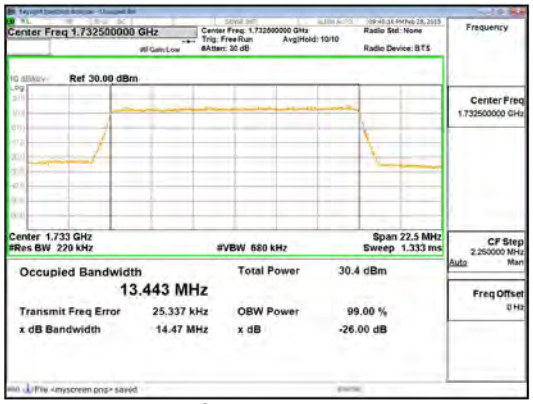
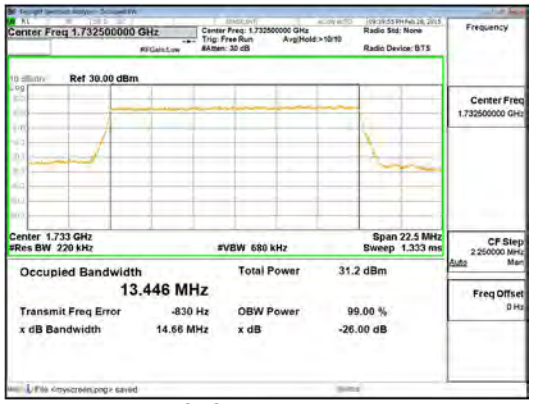
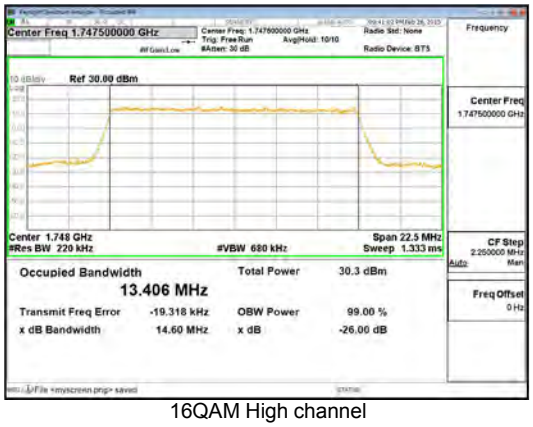
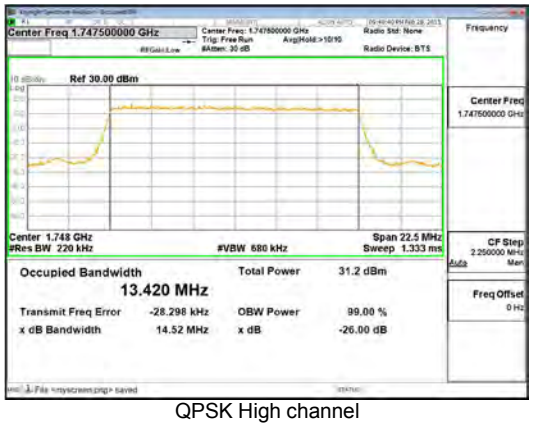
Band 2 1.4MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

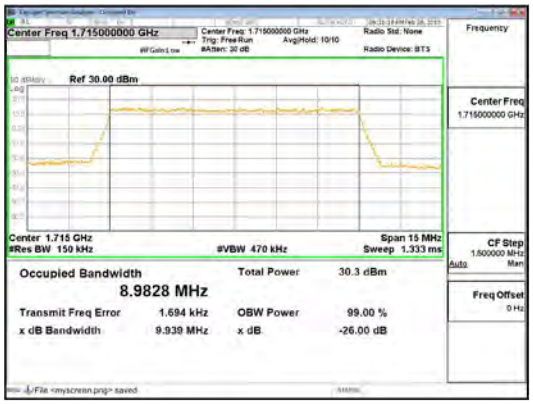
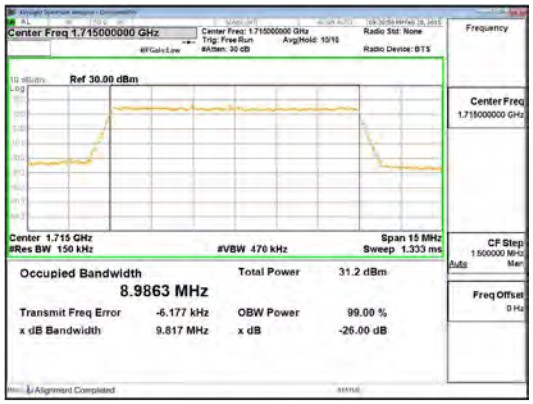
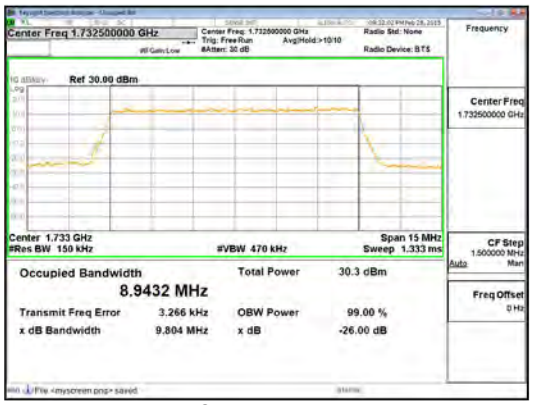
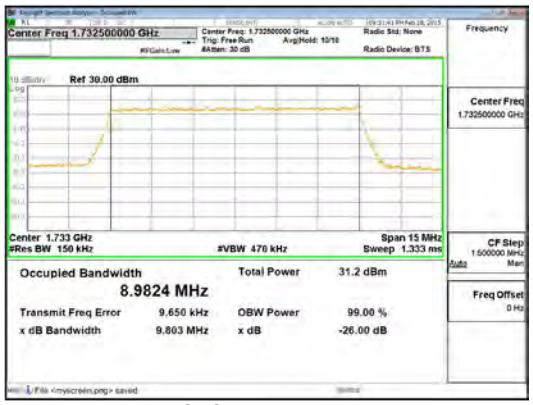
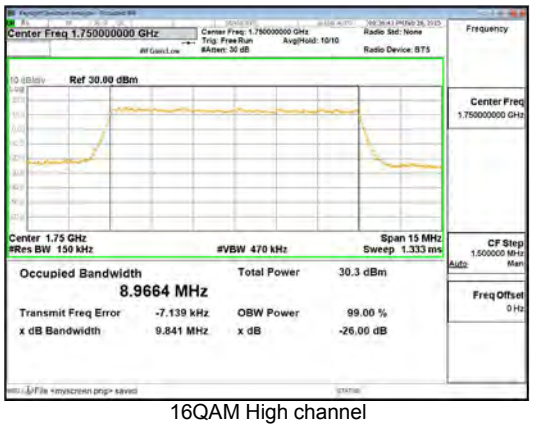
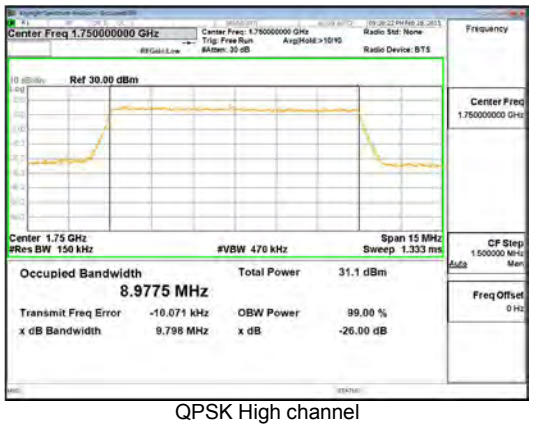
LTE Band 4

Band 4 20MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

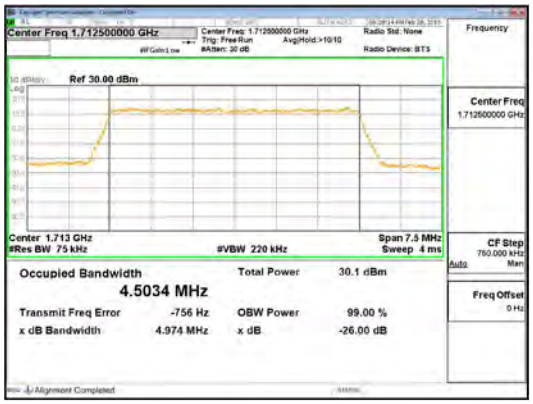
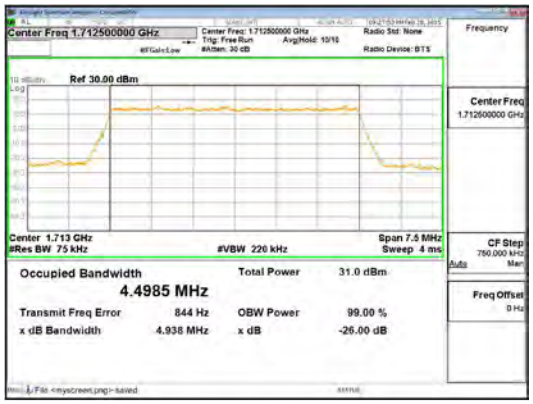
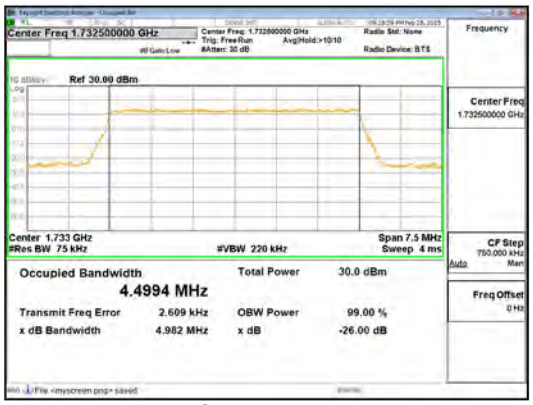
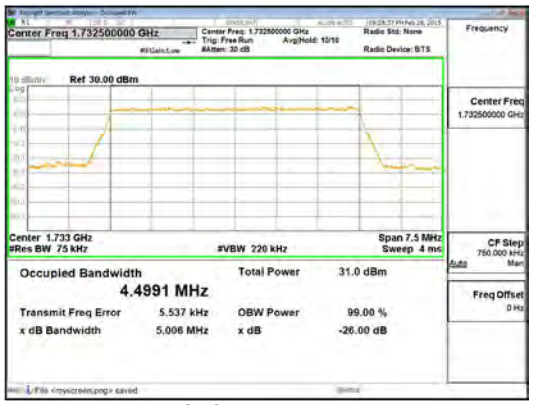
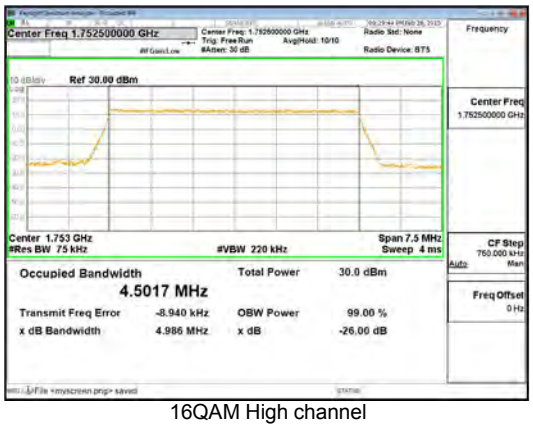
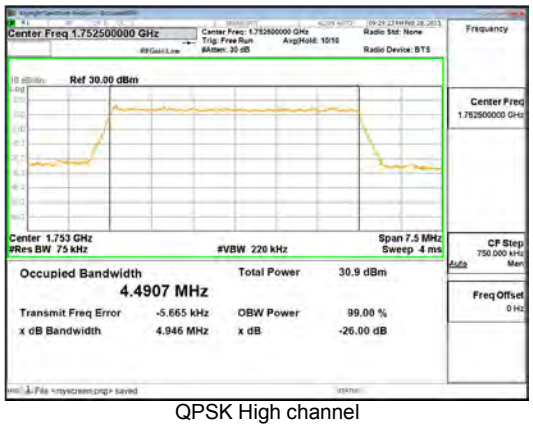
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 15MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

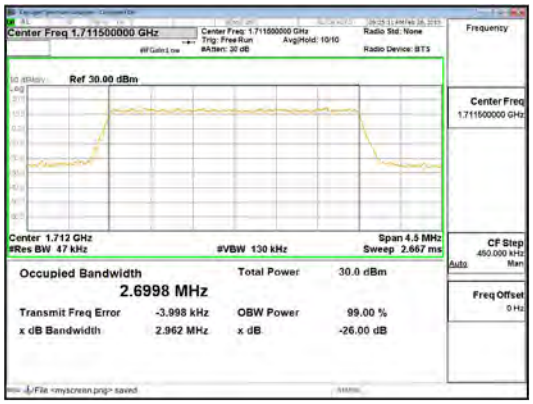
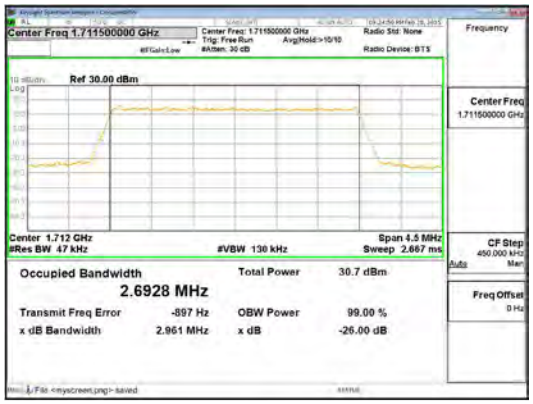
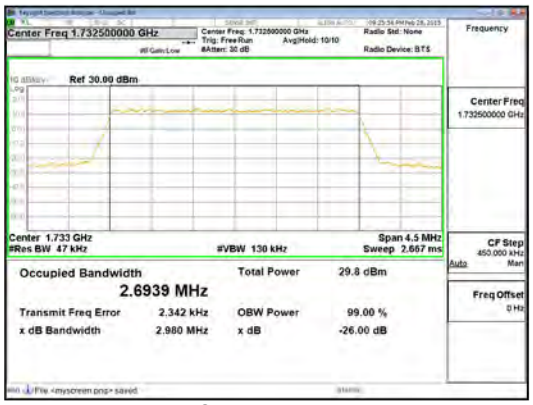
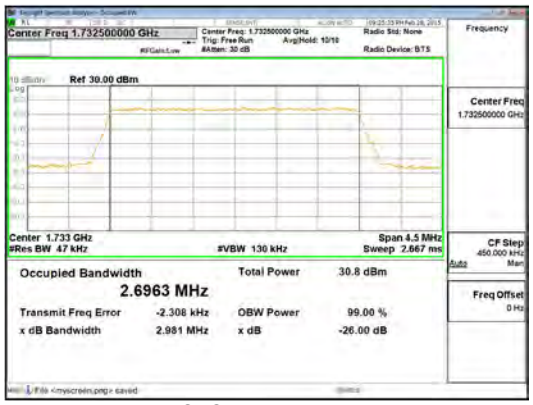
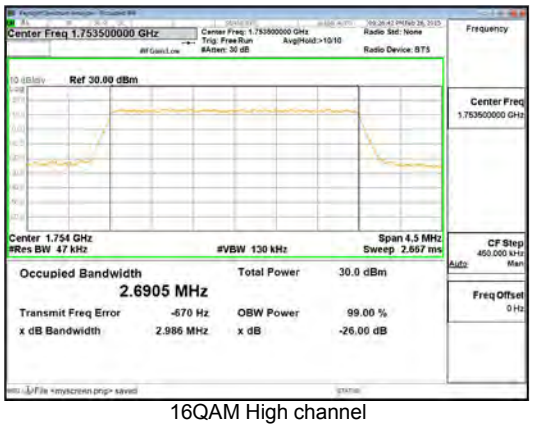
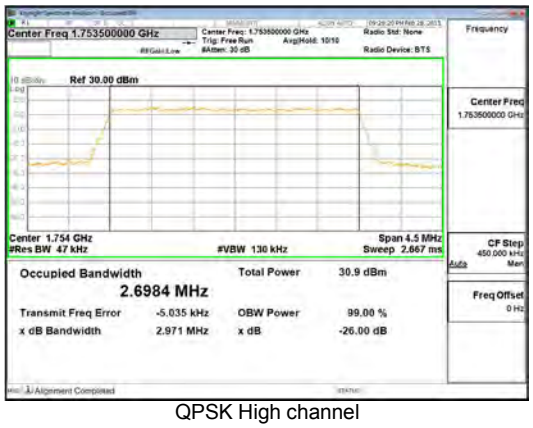
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 10MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

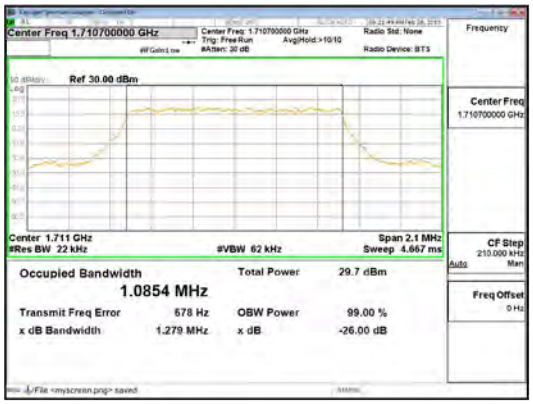
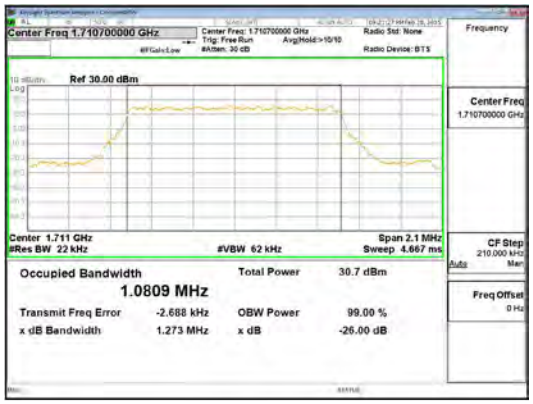
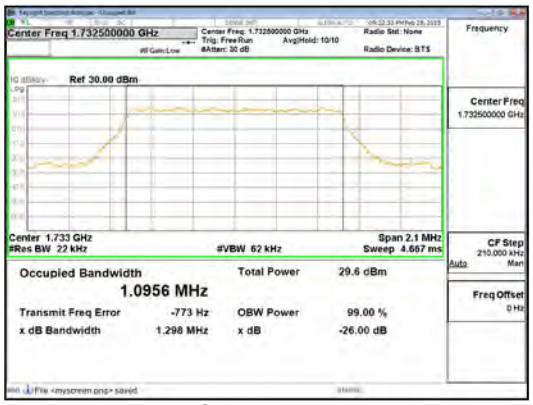
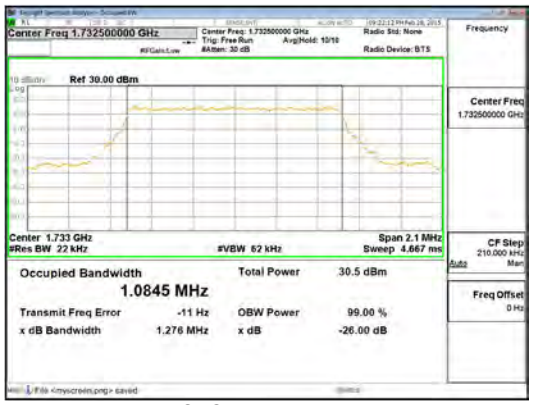
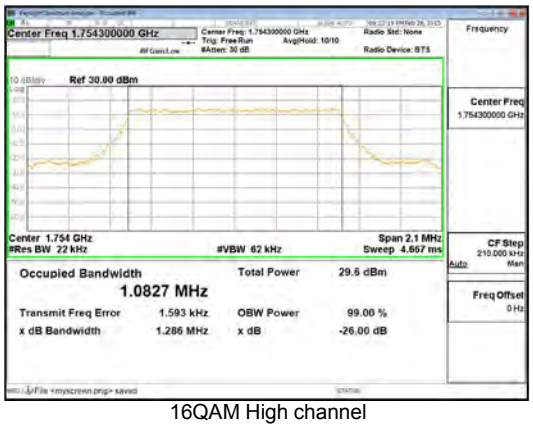
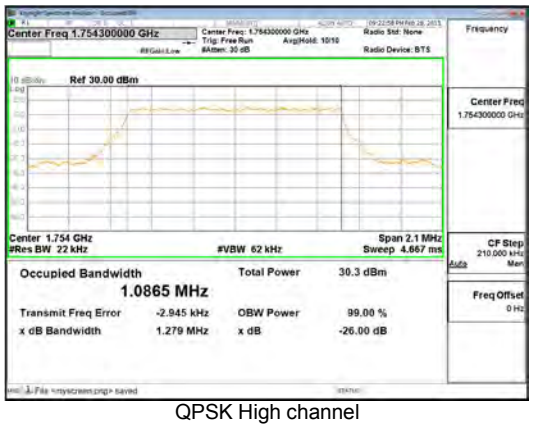
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 5MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 3MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 1.4MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

10.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §24.238

LIMITS

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

TEST PROCEDURE

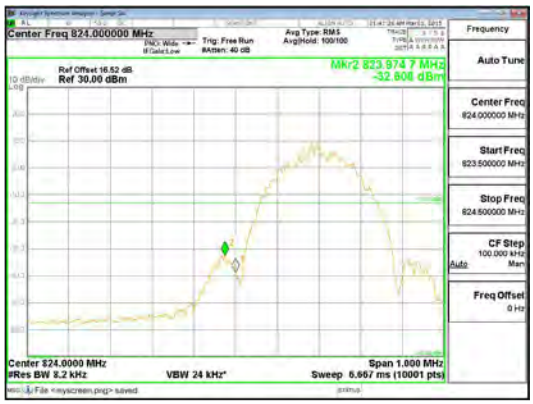
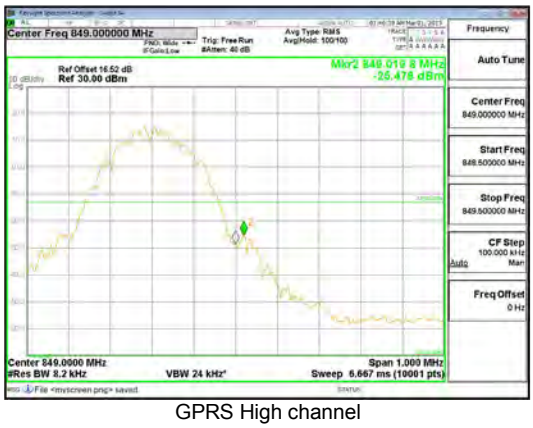
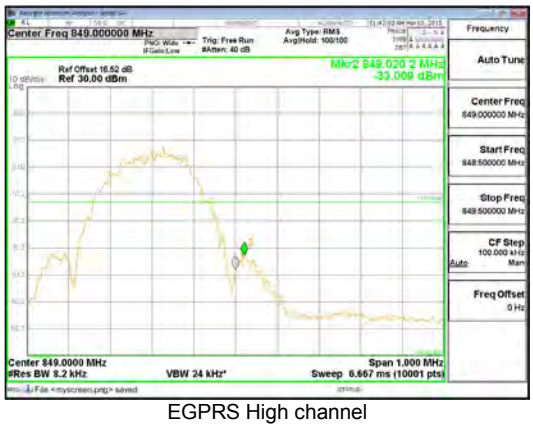
Per KDB 971168 D01 Power Meas License Digital Systems v02r02
The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

RESULTS

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

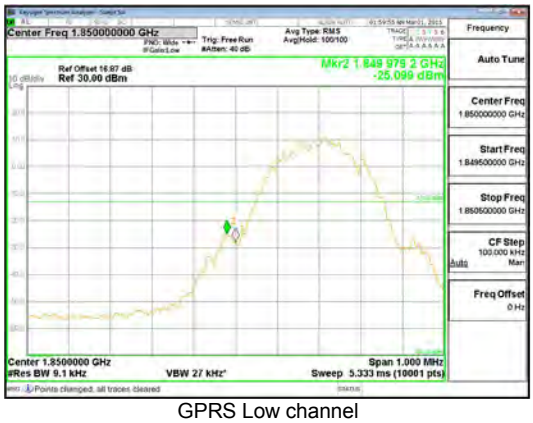
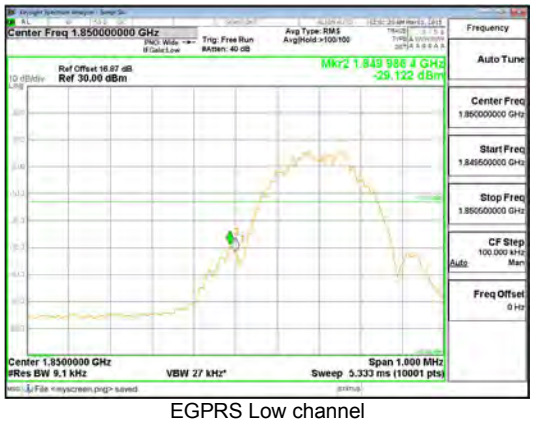
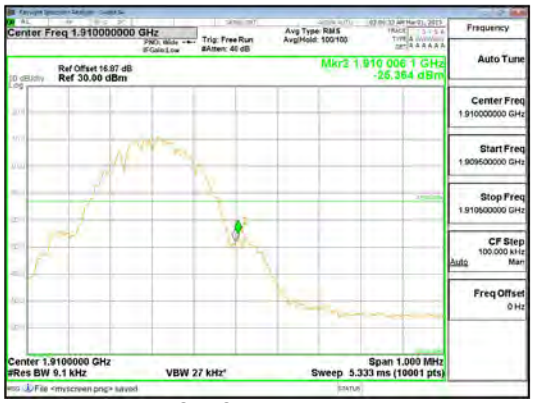
10.2.1. BAND EDGE PLOTS

GSM 850

Band 850	 GPRS Low channel	 EGPRS Low channel
	 GPRS High channel	 EGPRS High channel

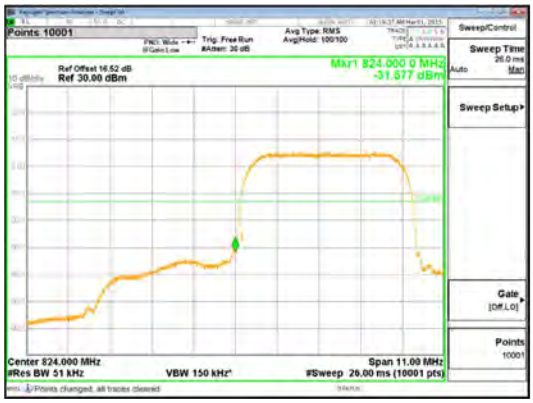
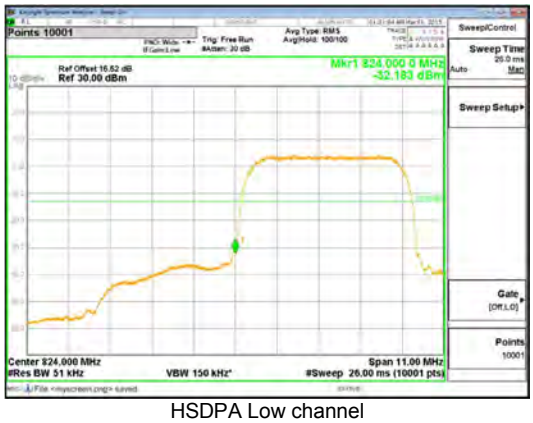
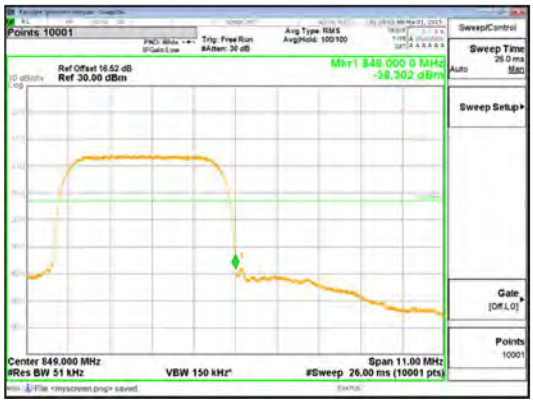
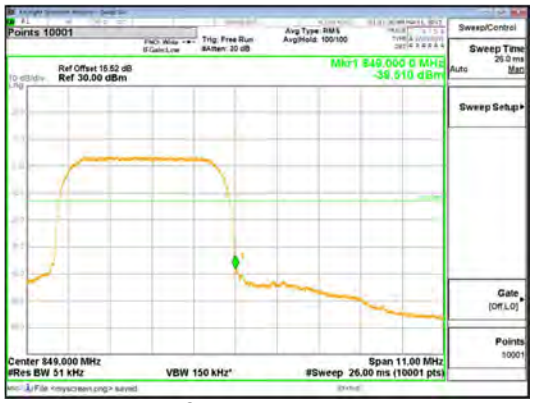
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

GSM 1900

Band 1900	 GPRS Low channel	 EGPRS Low channel
	 GPRS High channel	 EGPRS High channel

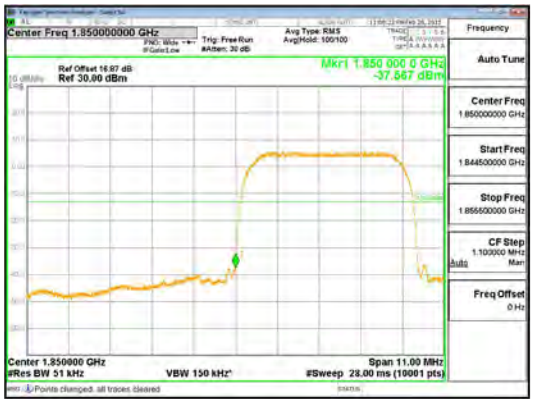
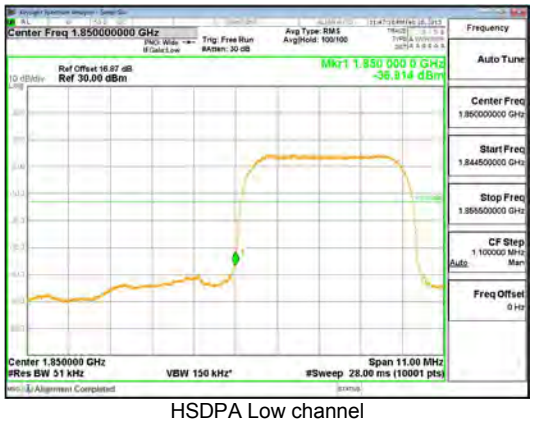
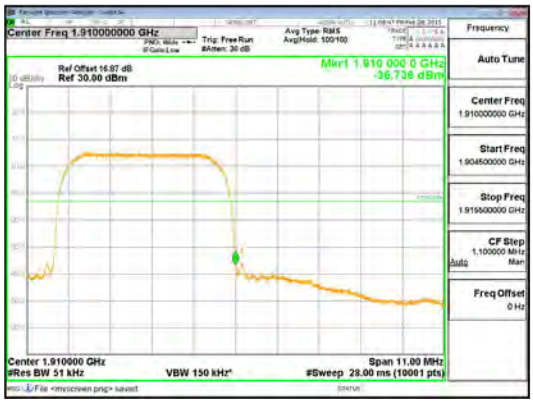
UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 5

Band 5	 REL99 Low channel	 HSDPA Low channel
	 REL99 High channel	 HSDPA High channel

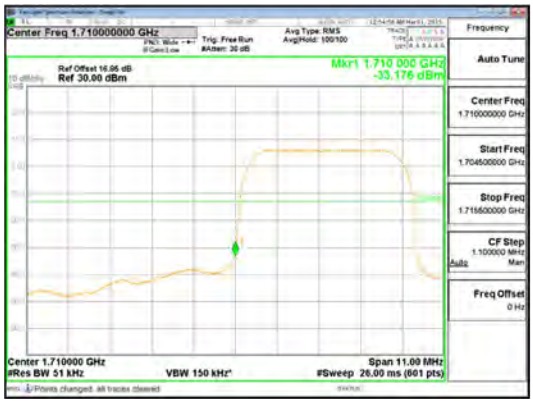
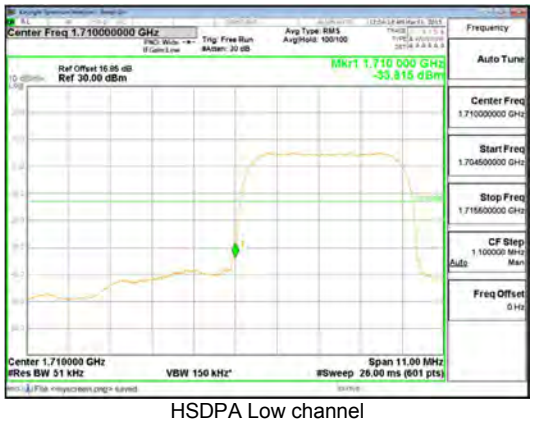
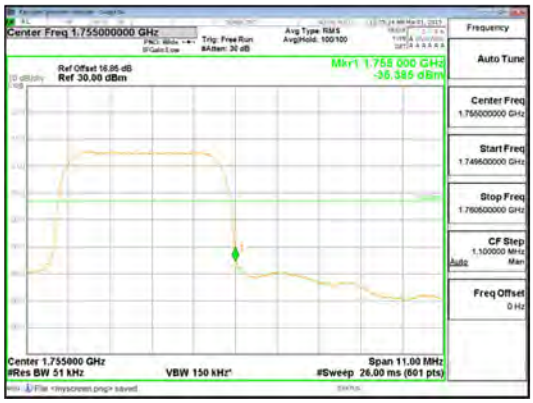
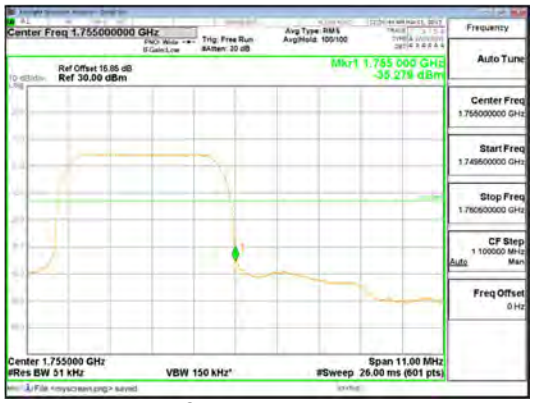
UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 2

Band 2	 REL99 Low channel	 HSDPA Low channel
	 REL99 High channel	 HSDPA High channel

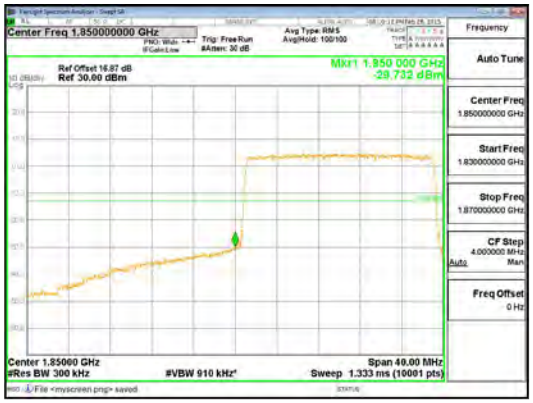
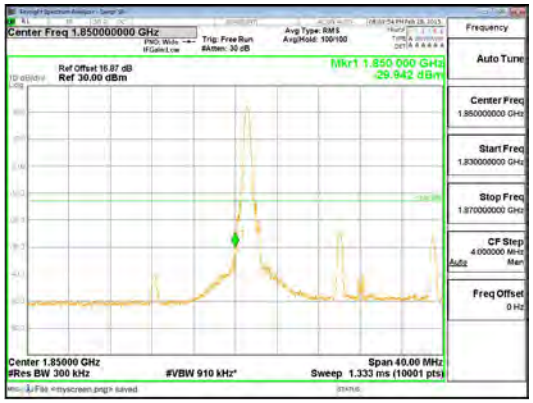
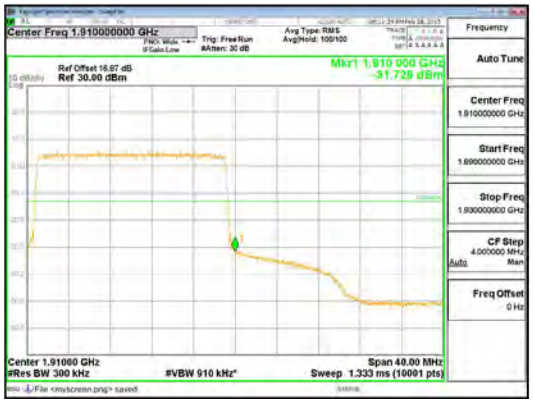
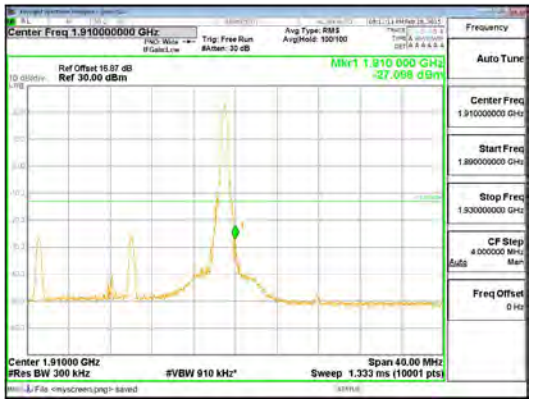
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 4

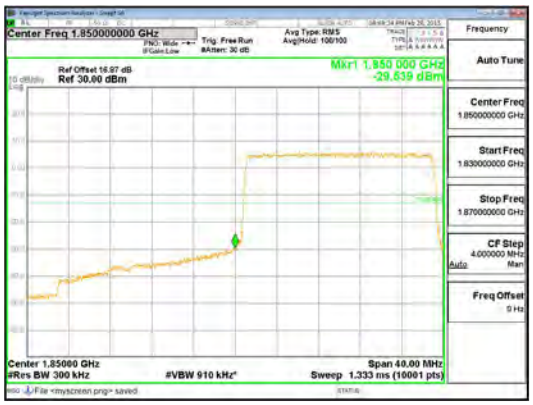
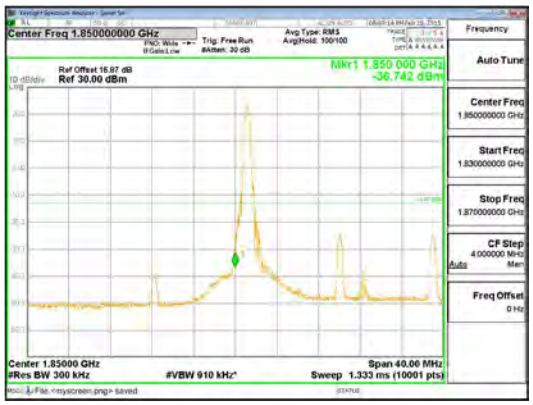
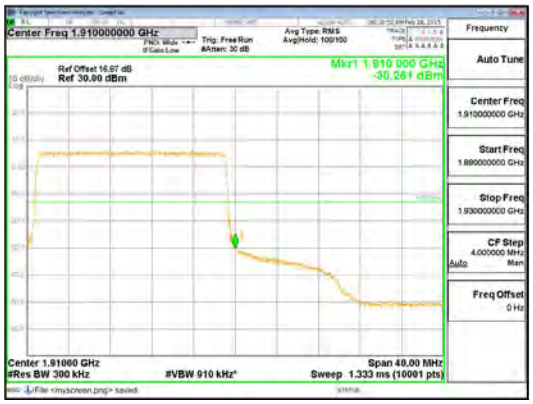
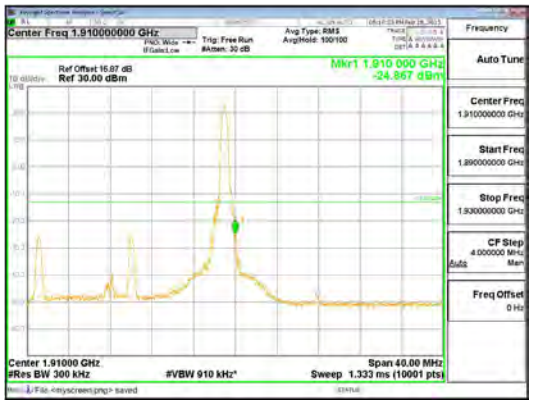
Band 4	 REL99 Low channel	 HSDPA Low channel
	 REL99 High channel	 HSDPA High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

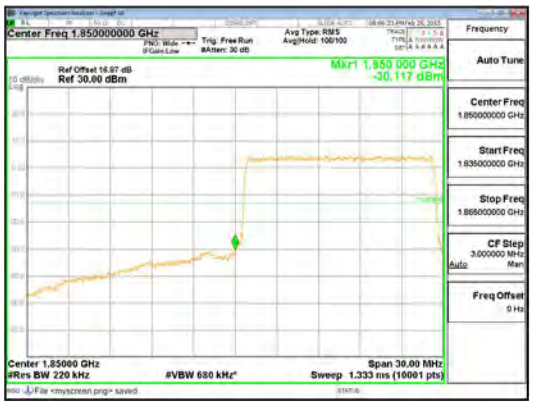
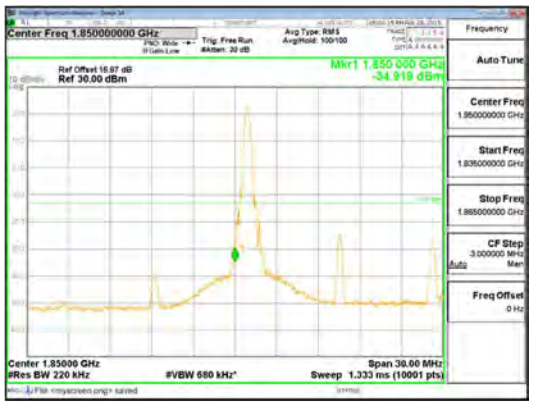
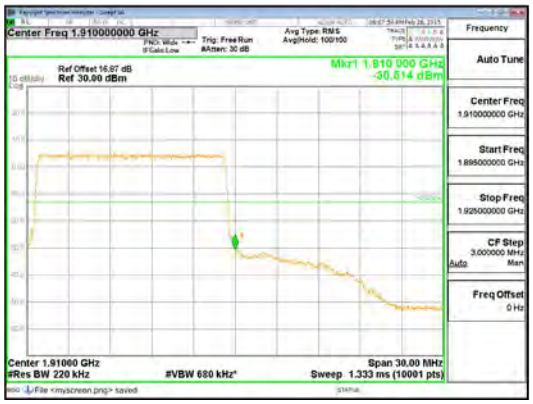
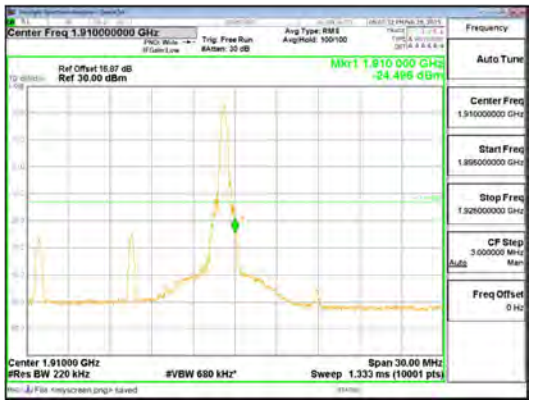
LTE Band 2

Band 2 20MHz 16QAM	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

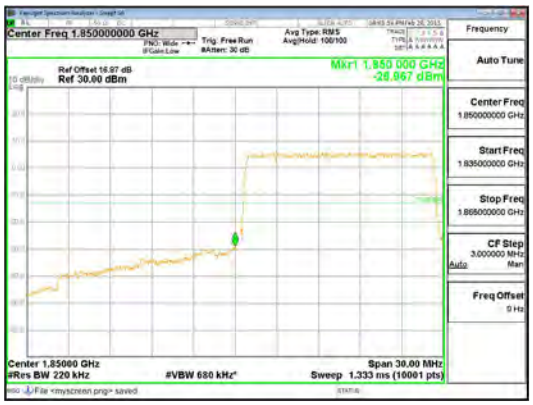
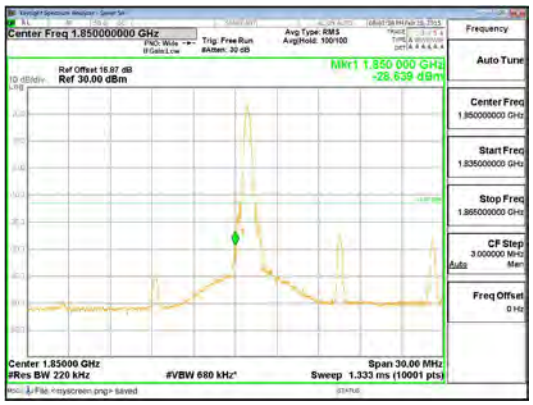
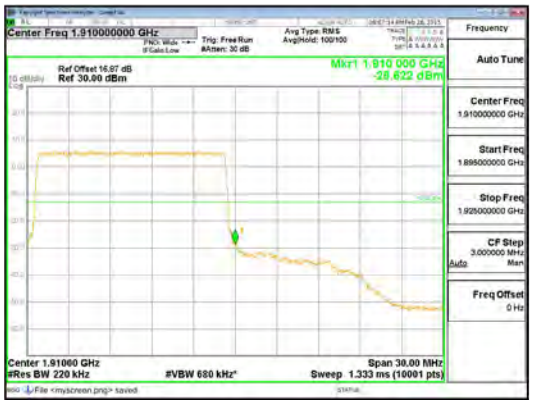
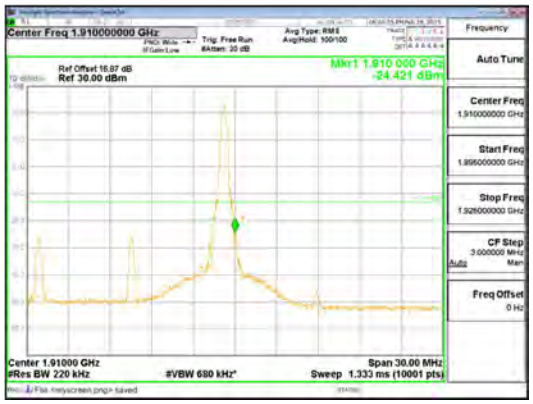
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 2 20MHz QPSK	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

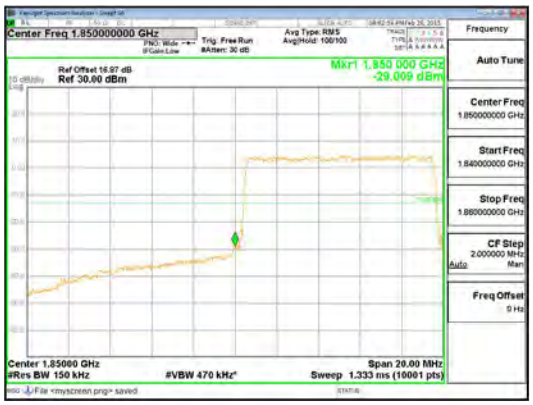
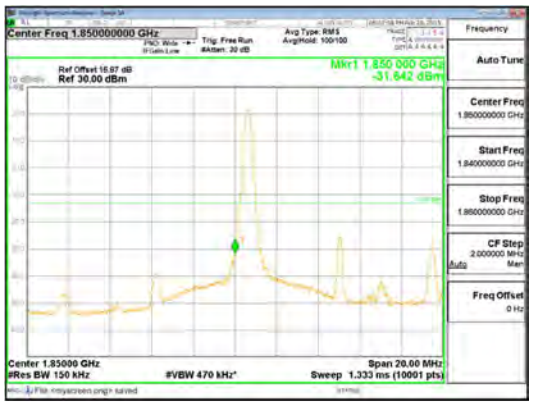
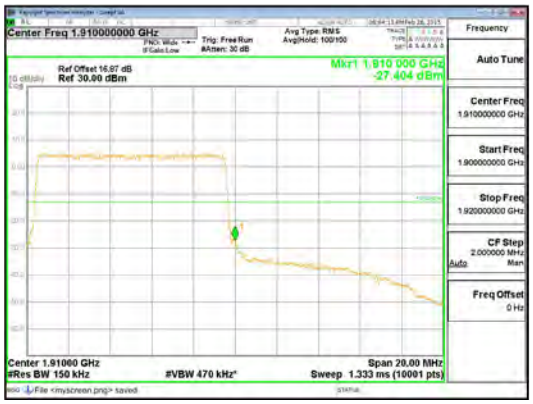
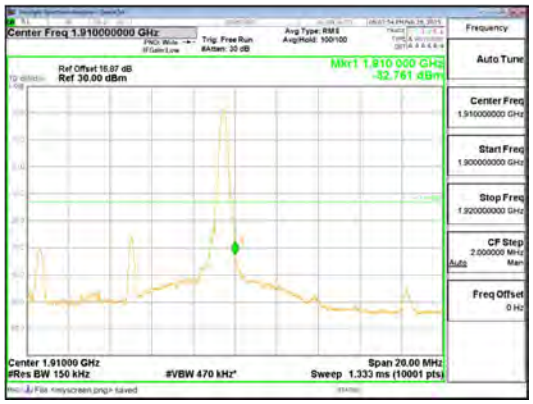
UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 2 15MHz 16QAM	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

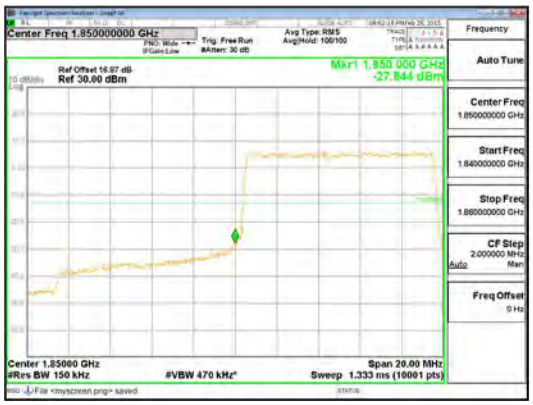
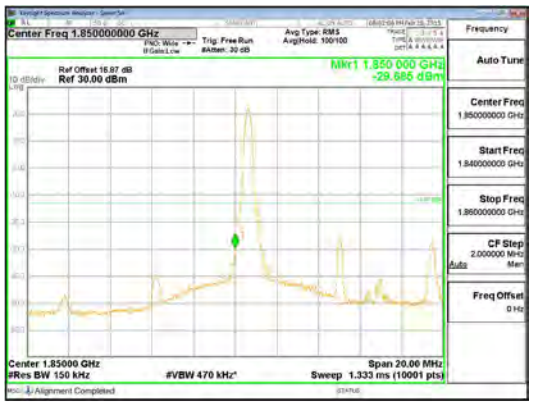
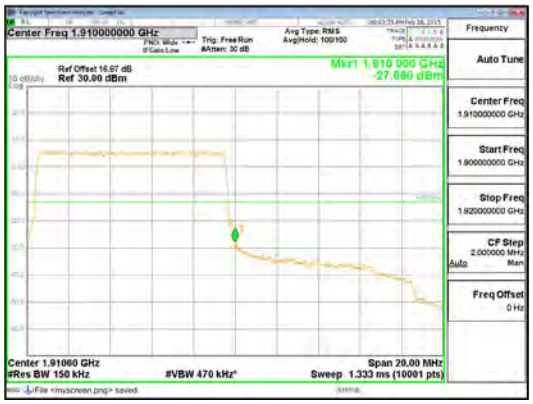
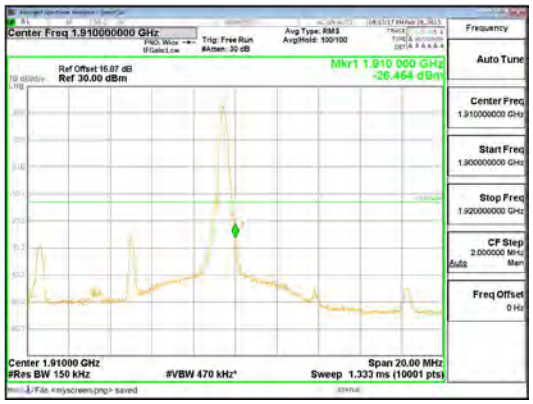
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 2 15MHz QPSK	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

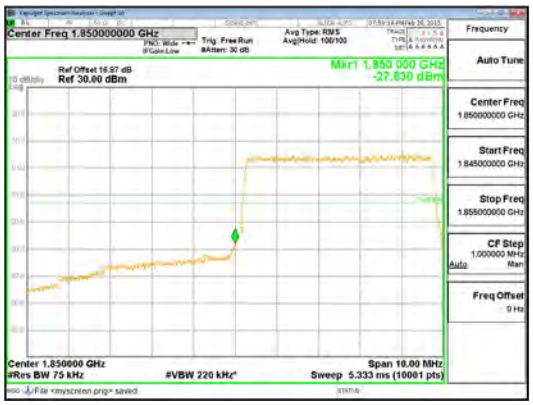
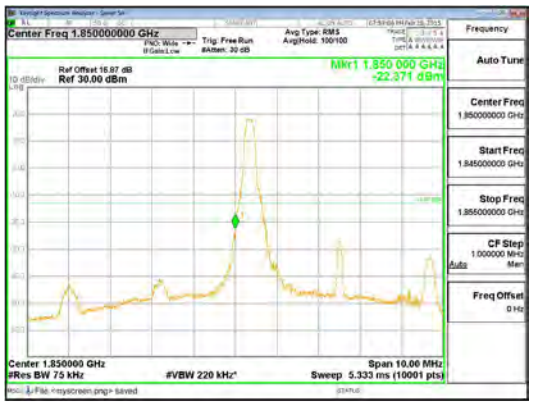
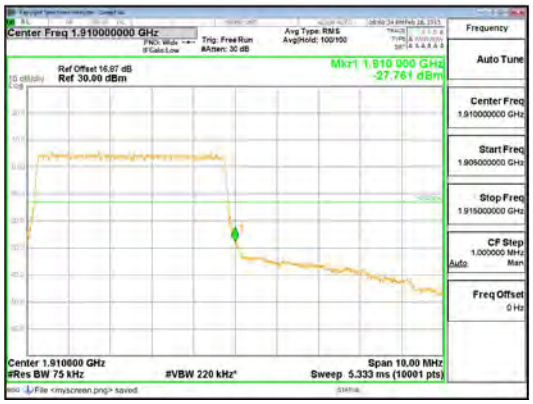
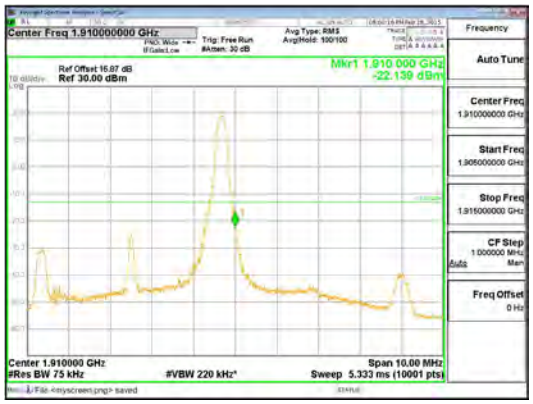
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 2 10MHz 16QAM	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

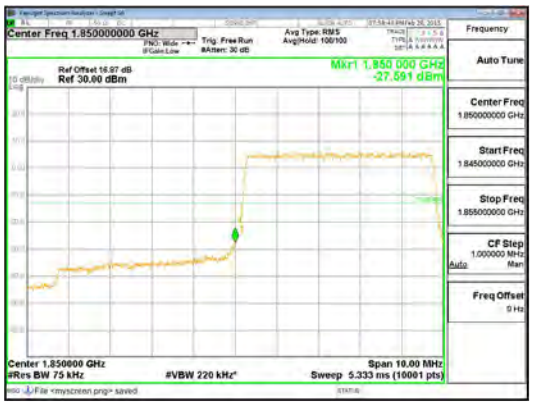
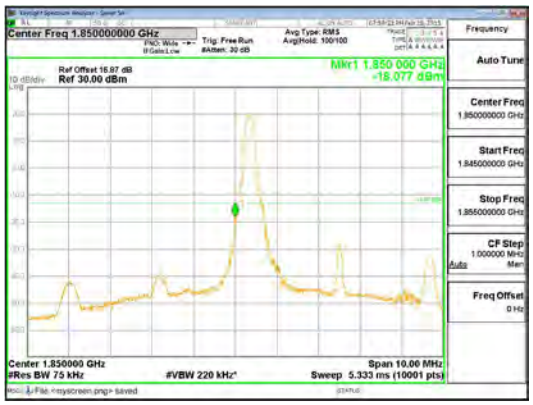
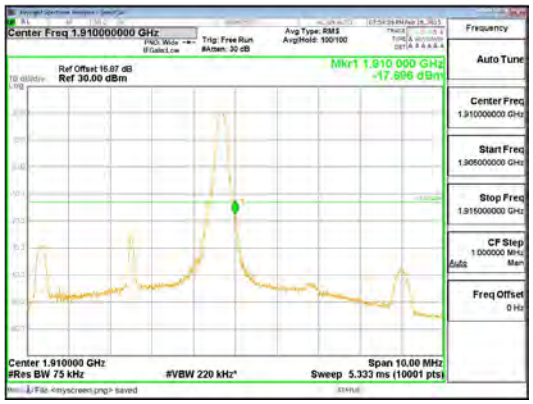
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 2 10MHz QPSK	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

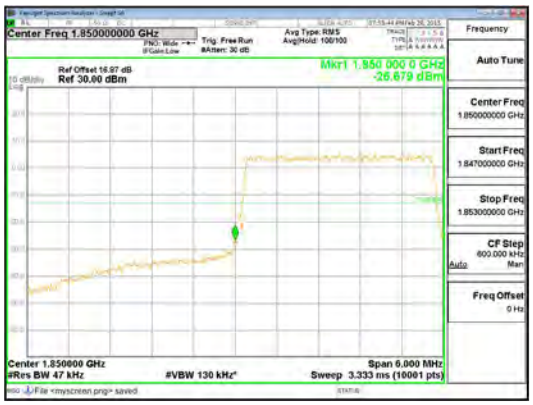
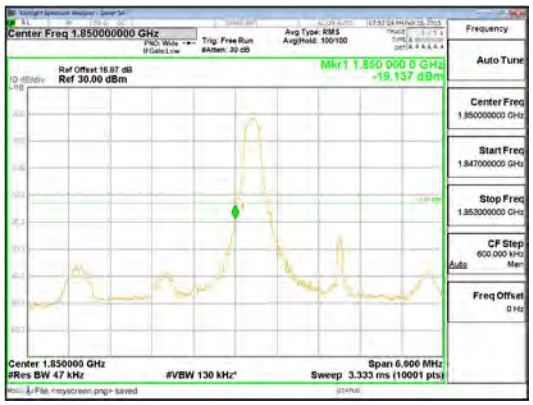
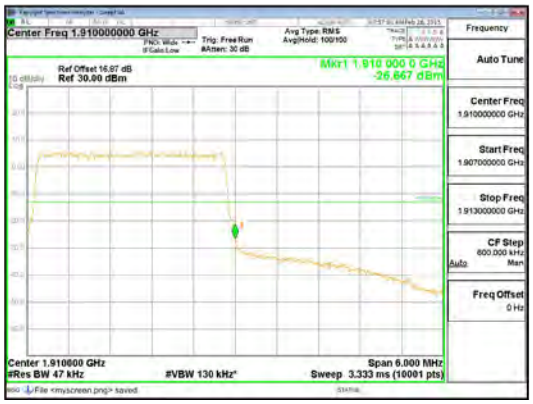
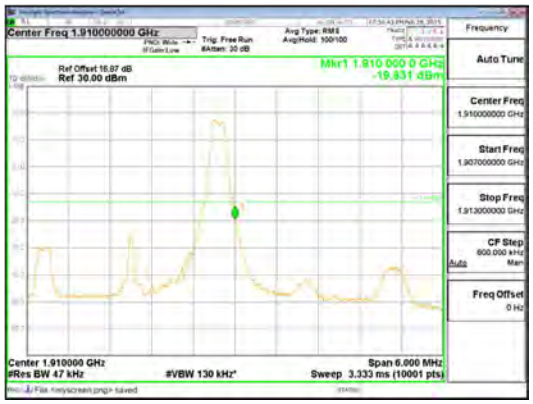
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 2 5MHz 16QAM	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

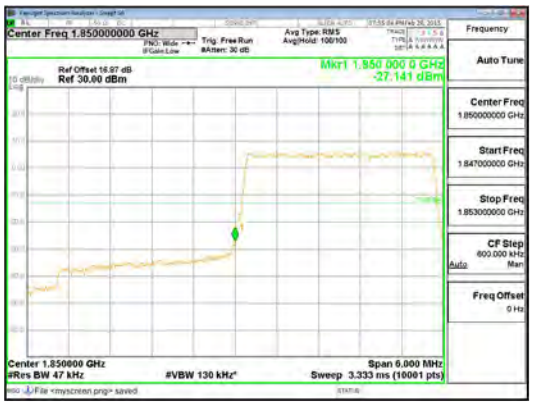
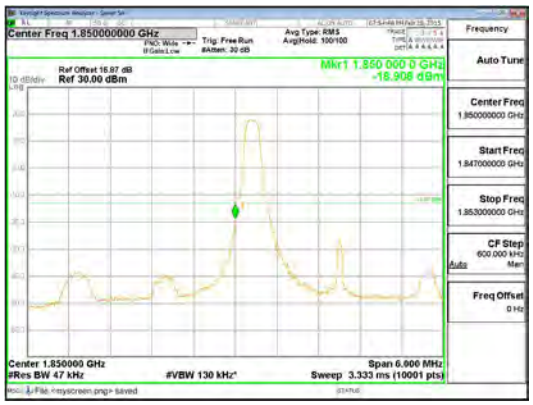
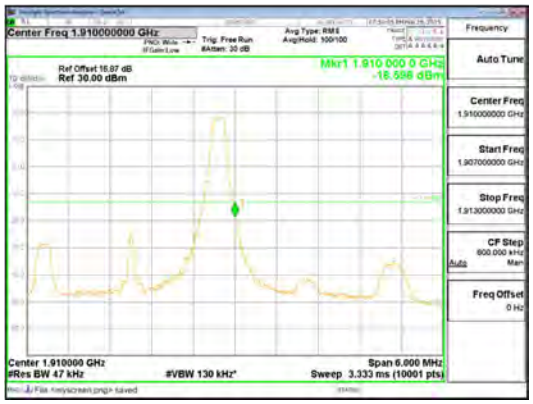
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 2 5MHz QPSK	 Low channel FRB	 Low channel 1RB
	  High channel FRB	 High channel 1RB

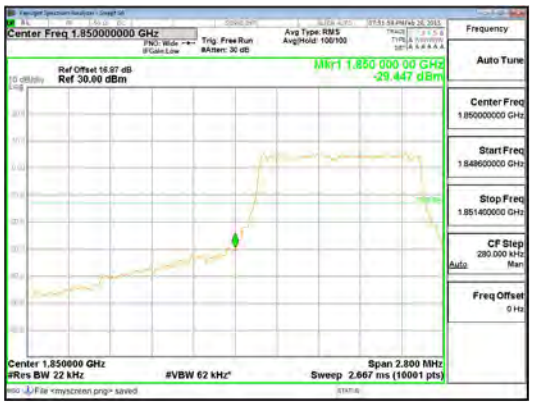
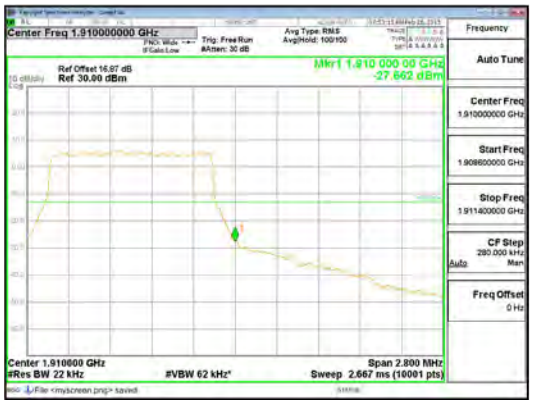
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 2 3MHz 16QAM	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

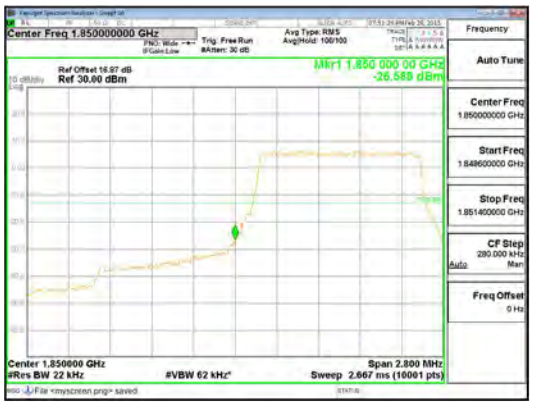
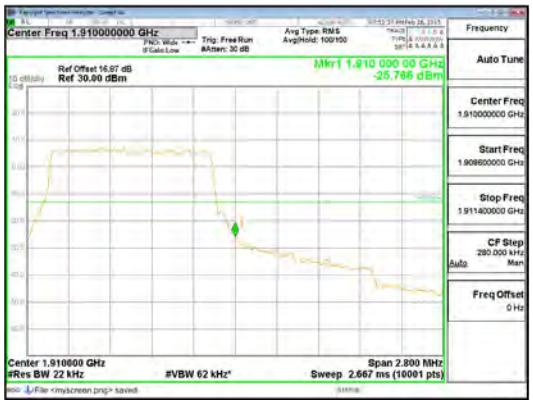
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 2 3MHz QPSK	 Low channel FRB	 Low channel 1RB
	  High channel FRB	 High channel 1RB

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

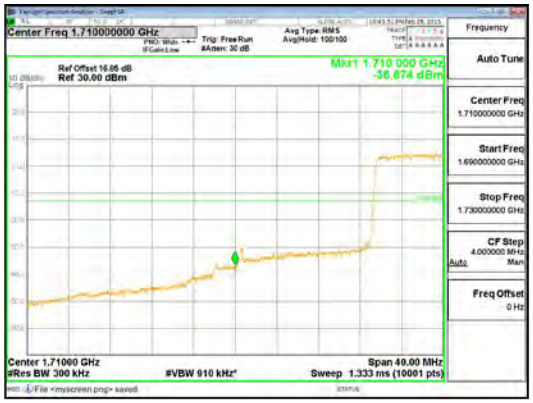
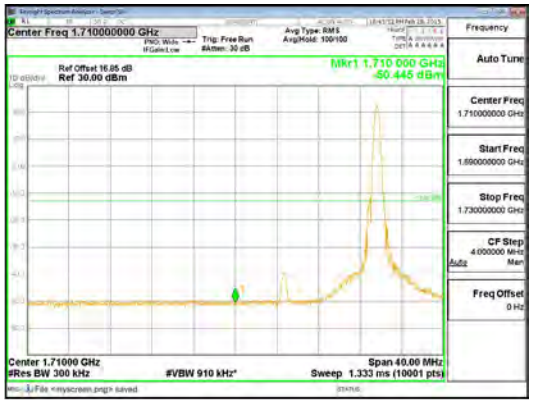
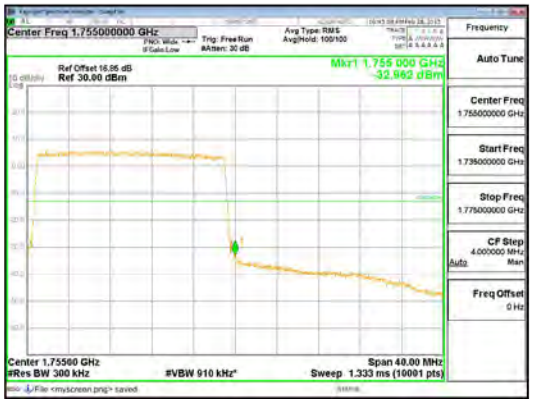
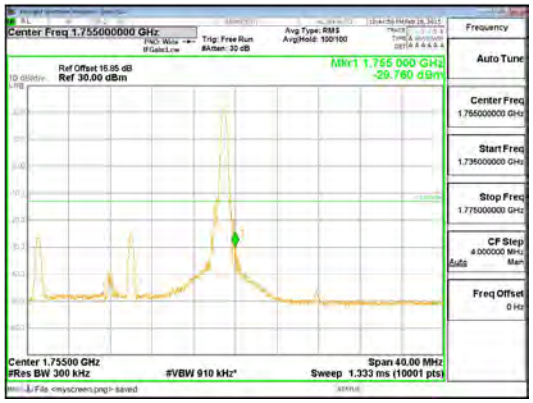
Band 2 1.4MHz 16QAM	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

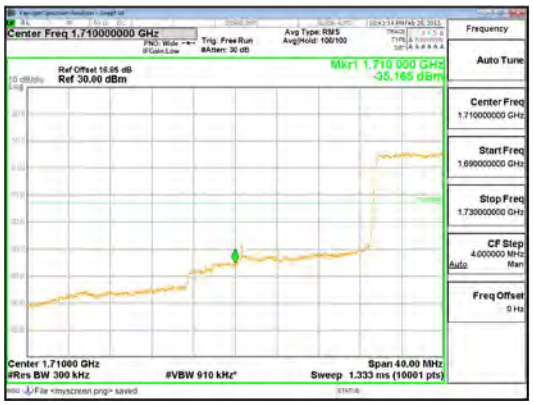
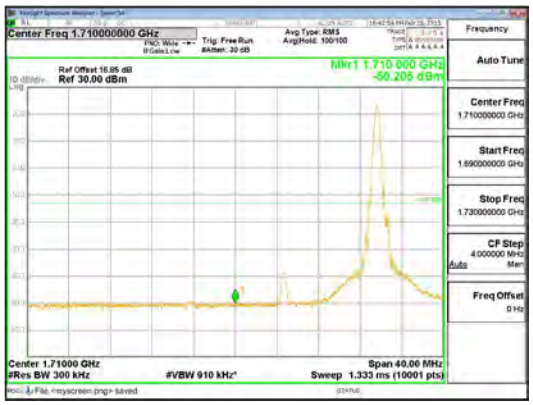
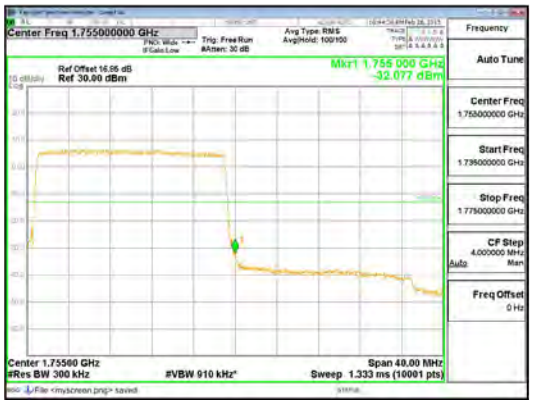
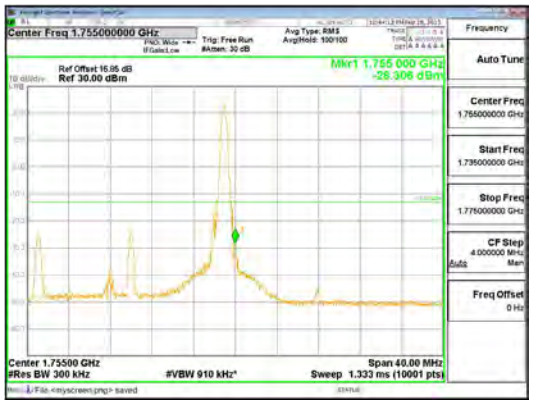
Band 2 1.4MHz QPSK	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

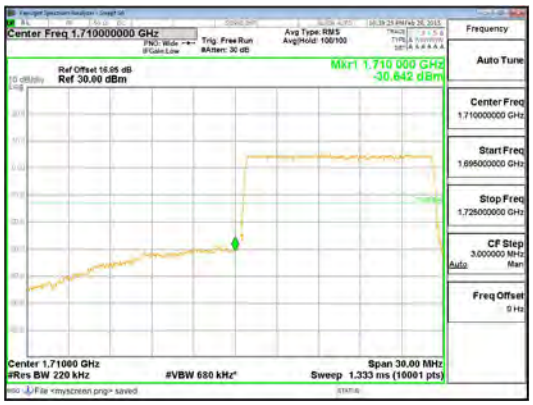
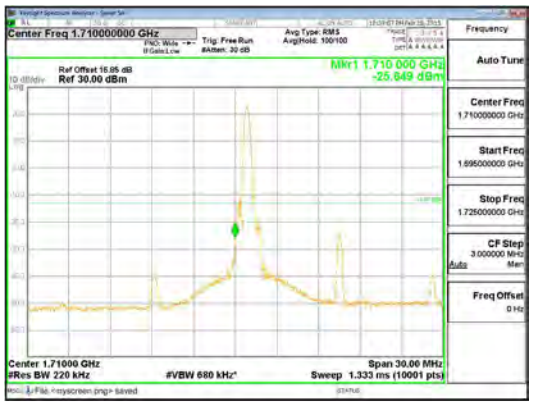
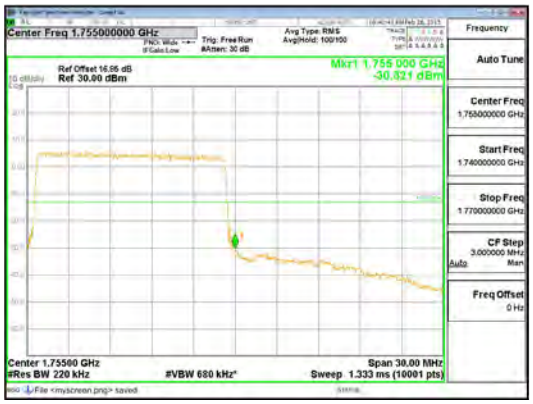
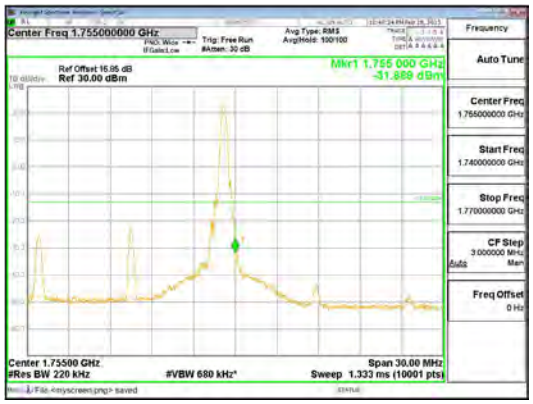
LTE Band 4

Band 4 20MHz 16QAM	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

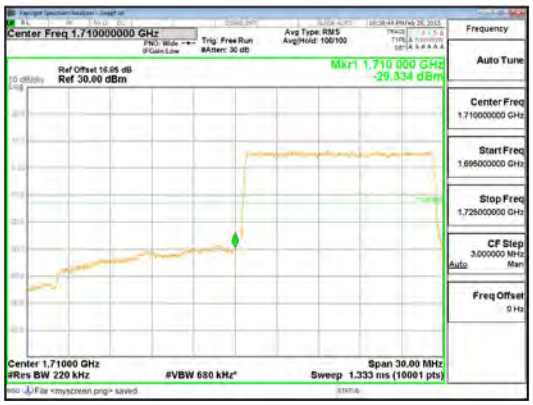
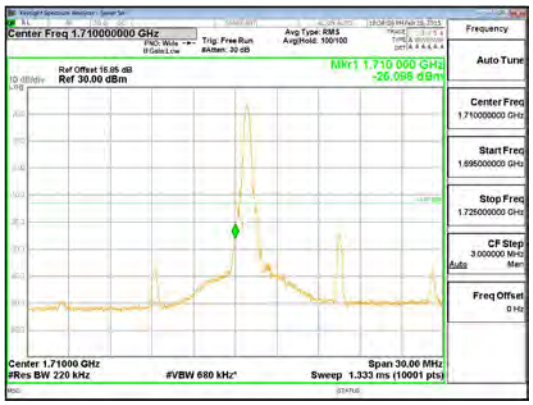
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 20MHz QPSK	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

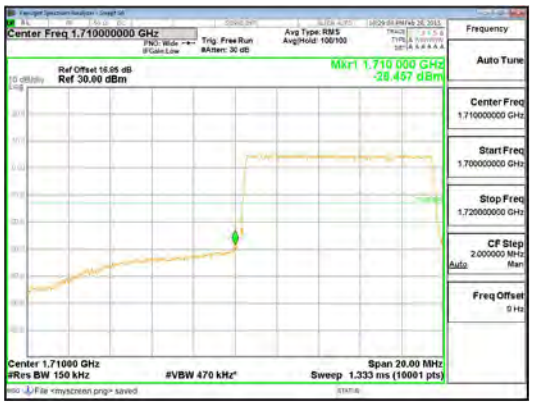
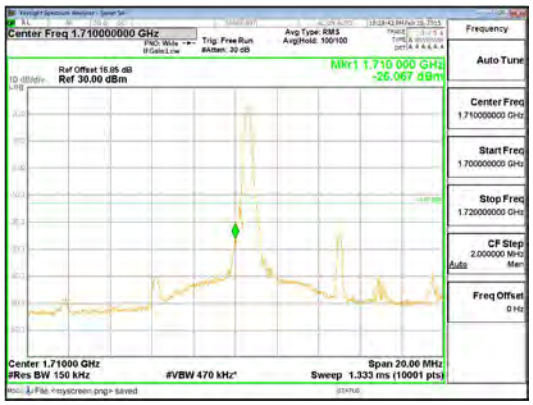
UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 15MHz 16QAM	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

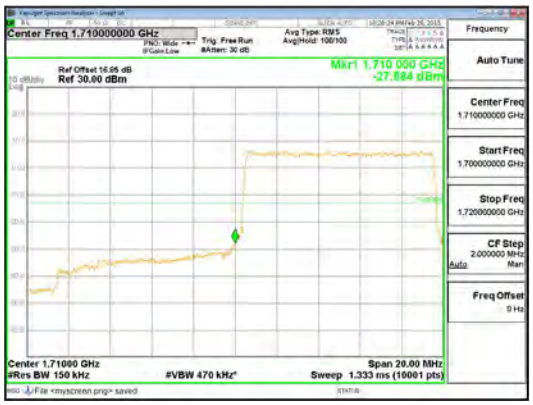
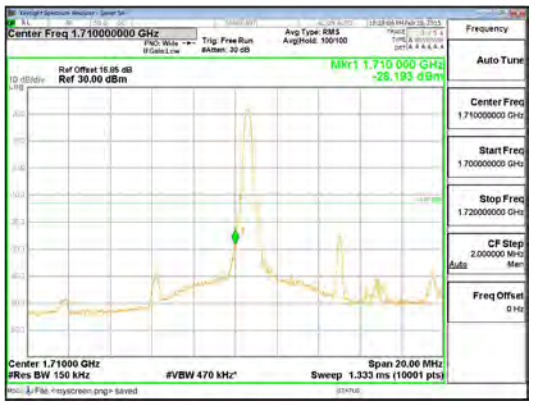
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 15MHz QPSK	 Low channel FRB	 Low channel 1RB
	  High channel FRB	 High channel 1RB

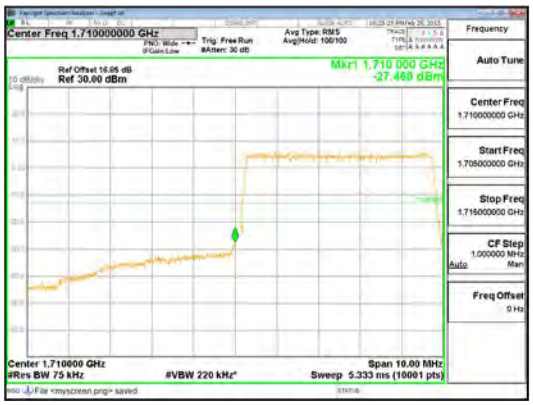
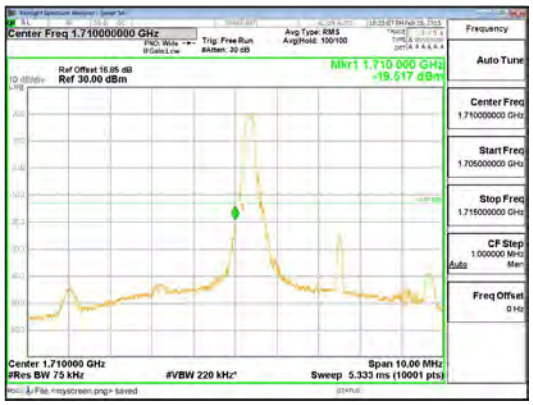
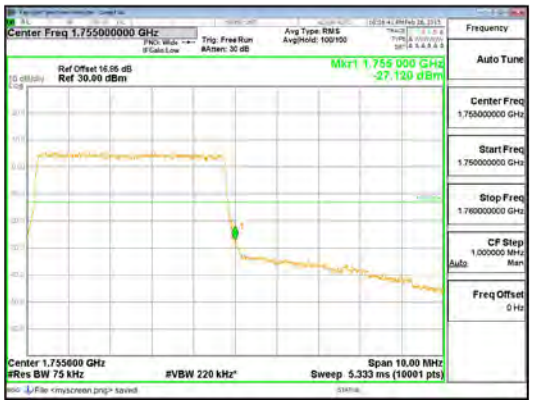
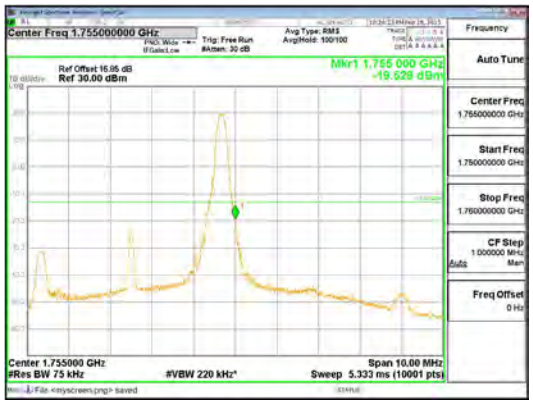
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 10MHz 16QAM	 Low channel FRB	 Low channel 1RB
	  High channel FRB	 High channel 1RB

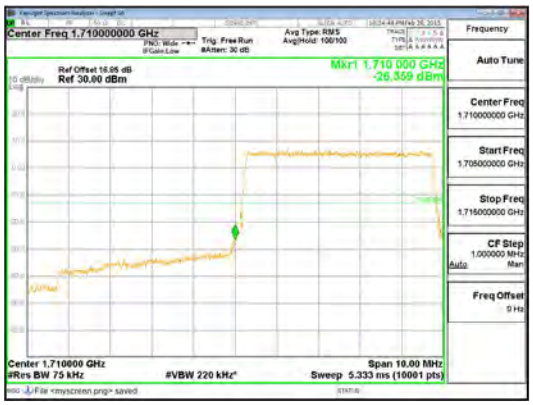
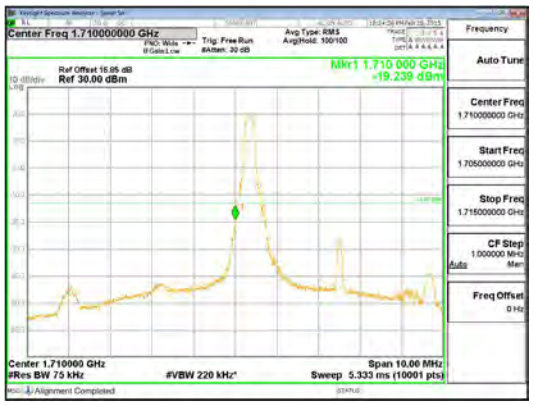
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 10MHz QPSK	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

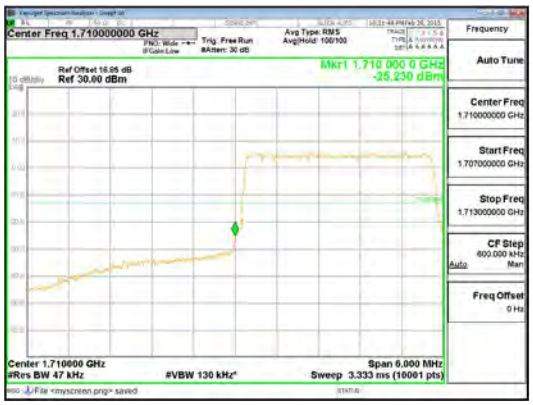
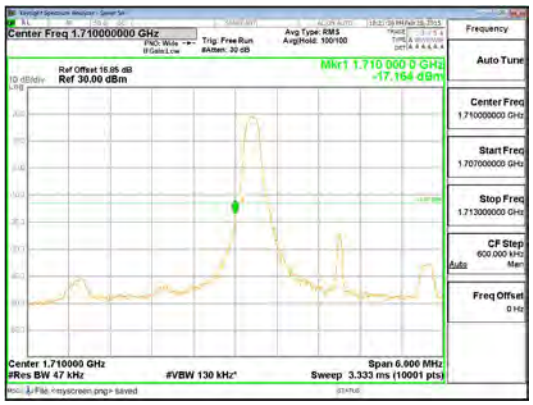
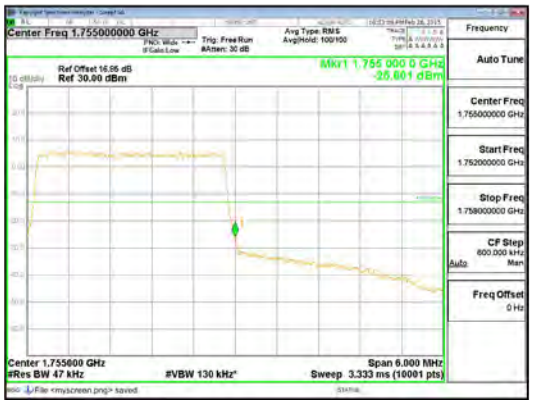
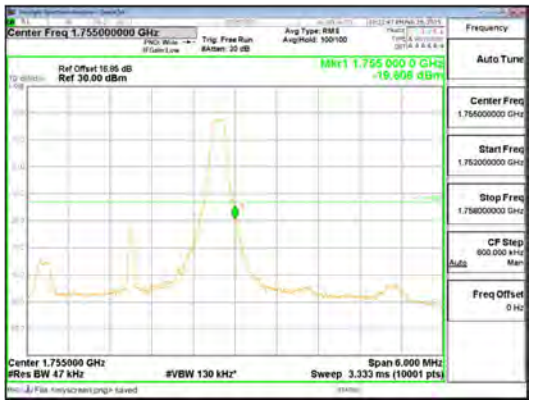
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 5MHz 16QAM	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

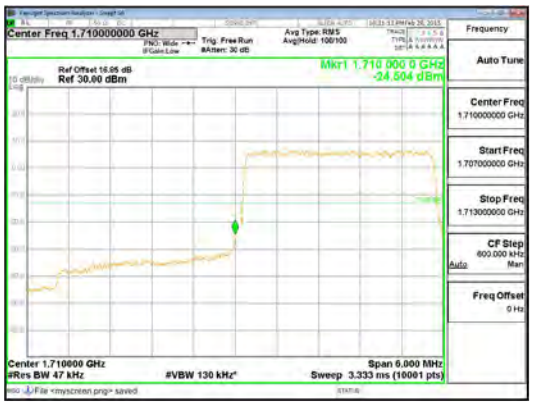
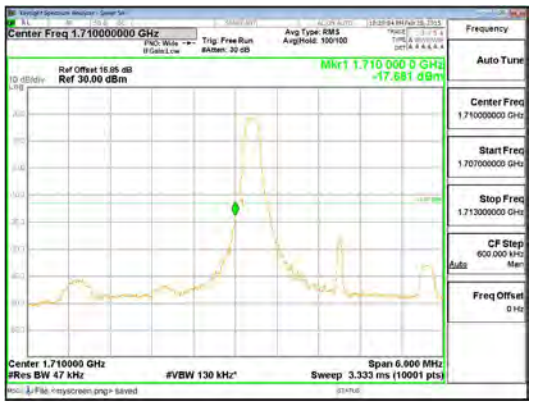
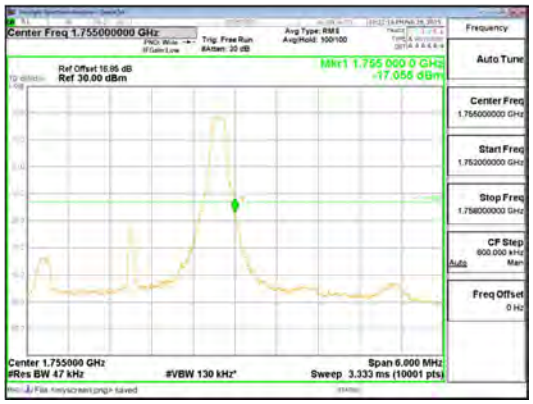
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 5MHz QPSK	 Low channel FRB	 Low channel 1RB
	  High channel FRB	 High channel 1RB

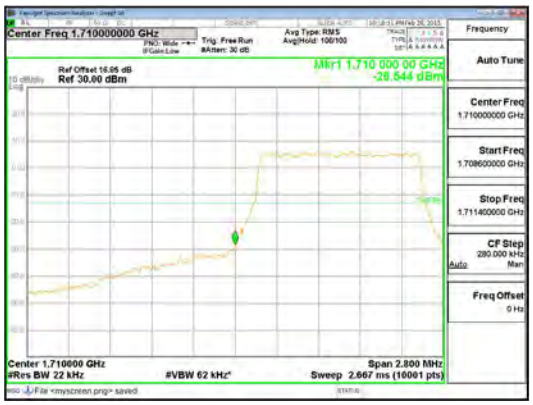
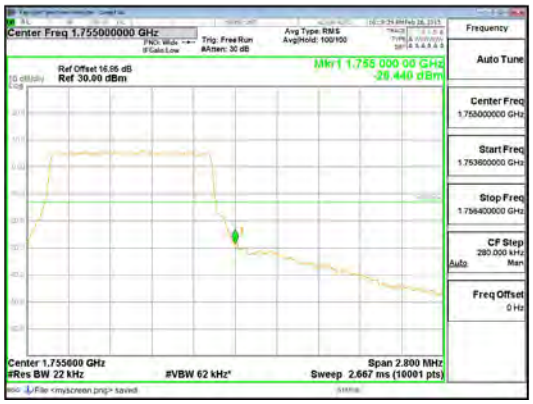
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 3MHz 16QAM	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

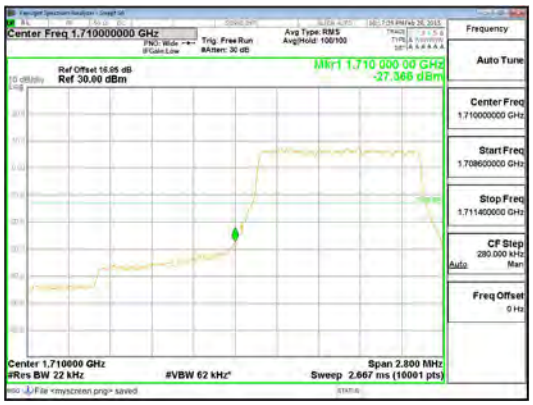
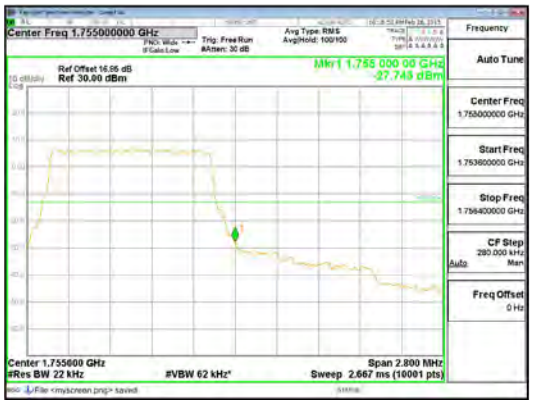
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 3MHz QPSK	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 1.4MHz 16QAM	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 1.4MHz QPSK	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

10.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238

LIMITS

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02
The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

RESULTS

10.3.1. OUT OF BAND EMISSIONS RESULT

GSM

Band	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]	Margin [dB]
GSM850	GPRS	824.2	-23.80	-13.00	10.80
		836.6	-23.49		10.49
		848.8	-24.01		11.01
	EGPRS	824.2	-23.49		10.49
		836.6	-23.23		10.23
		848.8	-23.51		10.51
GSM1900	GPRS	1850.2	-23.12		10.12
		1880.0	-23.51		10.51
		1909.8	-22.57		9.57
	EGPRS	1850.2	-23.97		10.97
		1880.0	-23.10		10.10
		1909.8	-23.29		10.29

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA

Band	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]	Margin [dB]
Band 5	REL99	826.4	-27.49	-13.00	14.49
		836.6	-27.78		14.78
		846.6	-28.04		15.04
	HSDPA	826.4	-27.07		14.07
		836.6	-27.66		14.66
		846.6	-27.21		14.21
Band 2	REL99	1852.4	-26.36		13.36
		1880.0	-27.50		14.50
		1907.6	-27.45		14.45
	HSDPA	1852.4	-26.62		13.62
		1880.0	-27.11		14.11
		1907.6	-27.21		14.21
Band 4	REL99	1712.4	-27.09		14.09
		1732.6	-27.83		14.83
		1752.6	-27.29		14.29
	HSDPA	1712.4	-27.47		14.47
		1732.6	-27.57		14.57
		1752.6	-27.25		14.25

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE 2

Band	BW(MHz)	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]	Margin [dB]
Band 2	20	QPSK	1860.0	-21.70	-13.00	8.70
			1880.0	-21.50		8.50
			1900.0	-22.14		9.14
		16QAM	1860.0	-21.64		8.64
			1880.0	-21.88		8.88
			1900.0	-21.60		8.60
	15	QPSK	1857.5	-22.11		9.11
			1880.0	-22.42		9.42
			1902.5	-21.64		8.64
		16QAM	1857.5	-22.18		9.18
			1880.0	-21.92		8.92
			1902.5	-22.32		9.32
	10	QPSK	1955.0	-21.47		8.47
			1880.0	-21.63		8.63
			1905.0	-22.06		9.06
		16QAM	1955.0	-21.66		8.66
			1880.0	-21.80		8.80
			1905.0	-22.50		9.50
	5	QPSK	1852.5	-21.12		8.12
			1880.0	-22.12		9.12
			1907.5	-22.08		9.08
		16QAM	1852.5	-21.57		8.57
			1880.0	-22.01		9.01
			1907.5	-22.06		9.06
	3	QPSK	1815.5	-21.32		8.32
			1880.0	-21.27		8.27
			1908.5	-22.23		9.23
		16QAM	1815.5	-21.63		8.63
			1880.0	-21.60		8.60
			1908.5	-22.26		9.26
	1.4	QPSK	1850.7	-21.90		8.90
			1880.0	-21.33		8.33
			1909.3	-21.92		8.92
		16QAM	1850.7	-22.04		9.04
			1880.0	-21.45		8.45
			1909.3	-21.89		8.89

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

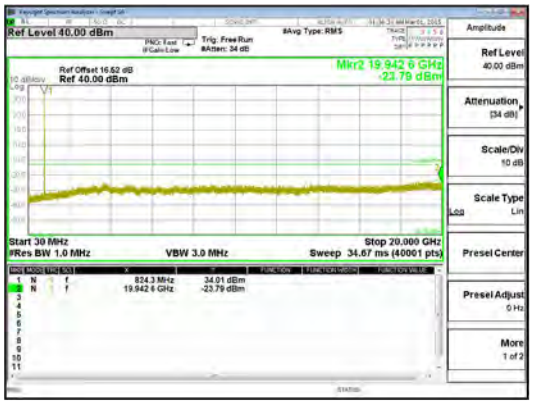
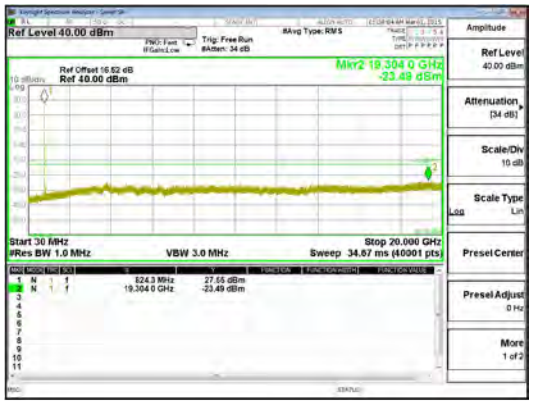
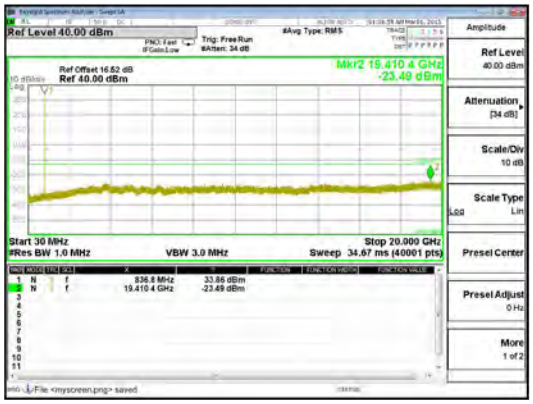
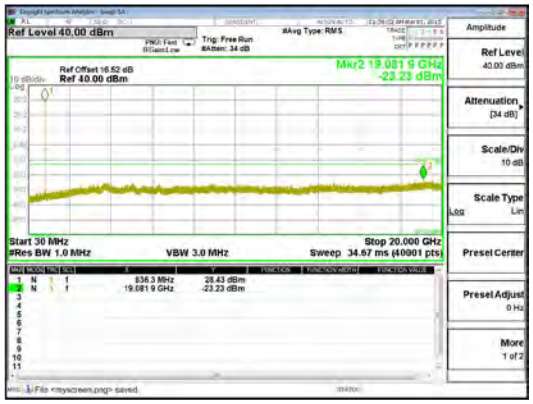
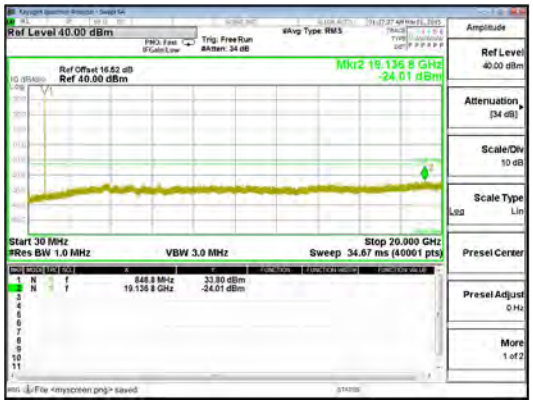
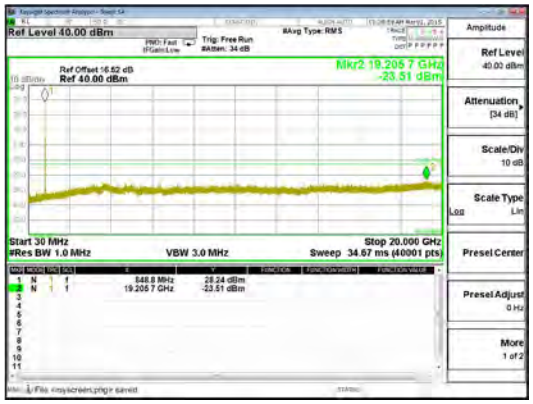
LTE 4

Band	BW(MHz)	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]	Margin [dB]
Band 4	20	QPSK	1720.0	-21.37	-13.00	8.37
			1732.5	-21.84		8.84
			1745.0	-21.52		8.52
		16QAM	1720.0	-21.81		8.81
			1732.5	-20.85		7.85
			1745.0	-22.10		8.10
	15	QPSK	1717.5	-22.09		9.09
			1732.5	-21.38		8.38
			1747.5	-21.15		8.15
		16QAM	1717.5	-21.90		8.90
			1732.5	-21.76		8.76
			1747.5	-21.68		8.68
	10	QPSK	1715.0	-21.68		8.68
			1732.5	-21.50		8.50
			1750.0	-21.87		8.87
		16QAM	1715.0	-20.92		7.92
			1732.5	-20.90		7.90
			1750.0	-21.89		8.89
	5	QPSK	1712.5	-21.33		8.33
			1732.5	-22.07		9.07
			1752.5	-21.57		8.57
		16QAM	1712.5	-21.74		8.74
			1732.5	-21.72		8.72
			1752.5	-21.10		8.10
	3	QPSK	1711.5	-21.49		8.49
			1732.5	-21.58		8.58
			1753.5	-22.09		9.09
		16QAM	1711.5	-21.40		8.40
			1732.5	-21.68		8.68
			1753.5	-22.22		9.22
	1.4	QPSK	1710.7	-21.46		8.46
			1732.5	-21.03		8.03
			1754.3	-21.48		8.48
		16QAM	1710.7	-20.94		7.94
			1732.5	-21.58		8.58
			1754.3	-21.43		8.43

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

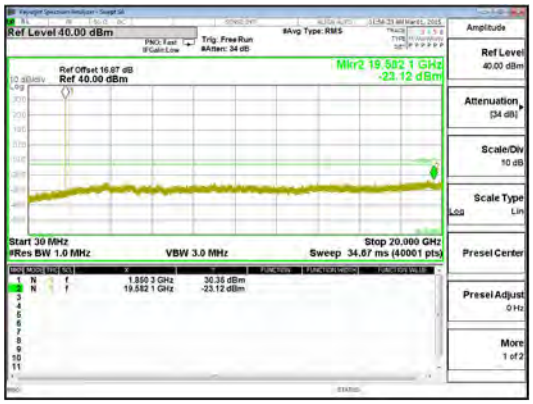
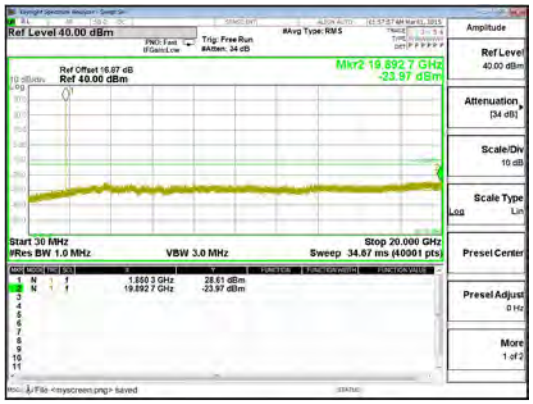
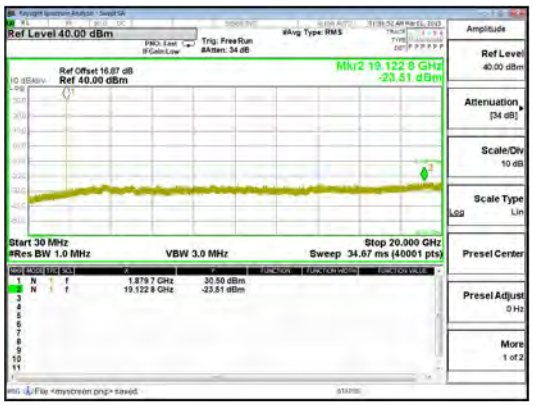
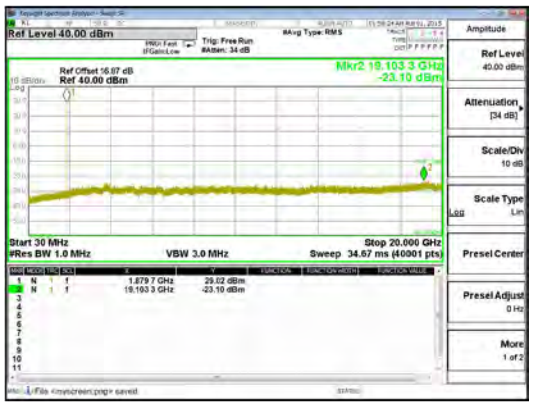
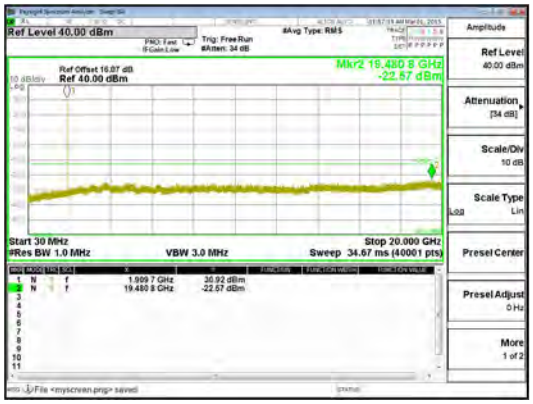
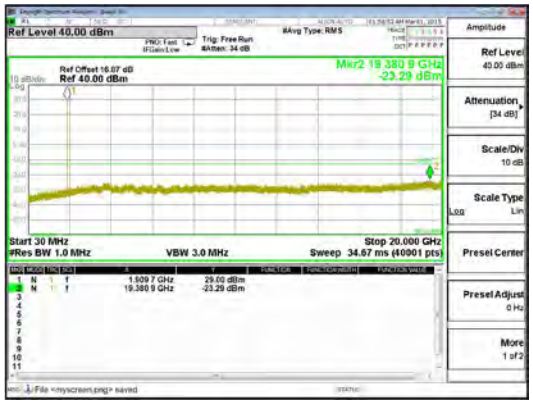
10.3.2. OUT OF BAND EMISSIONS PLOTS

GSM 850

Band 850	 GPRS Low channel	 EGPRS Low channel
	 GPRS Mid channel	 EGPRS Mid channel
	 GPRS High channel	 EGPRS High channel

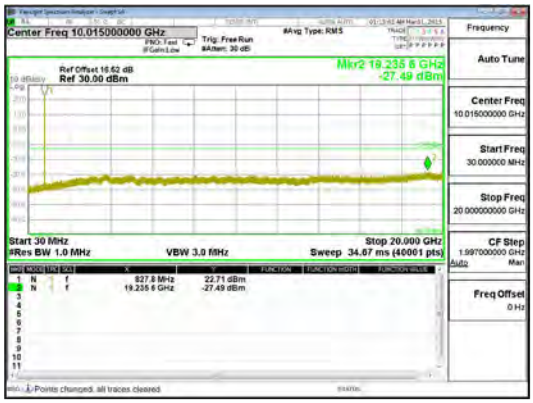
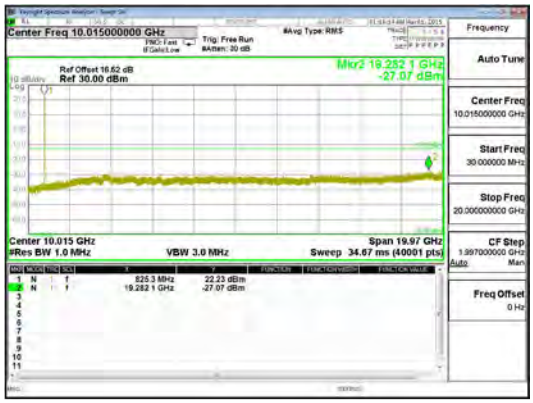
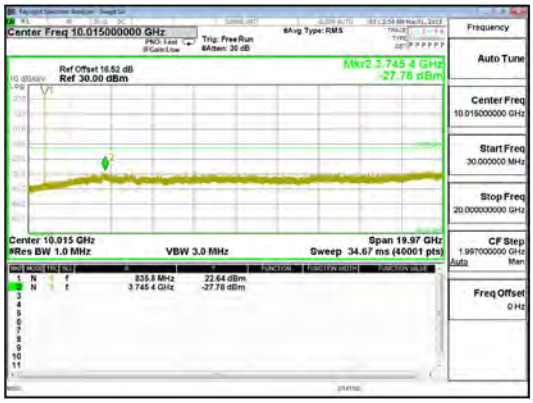
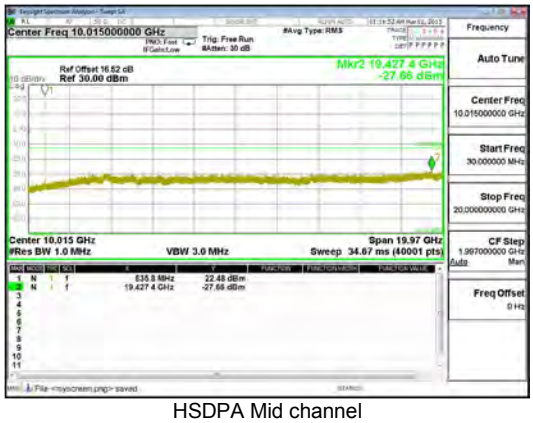
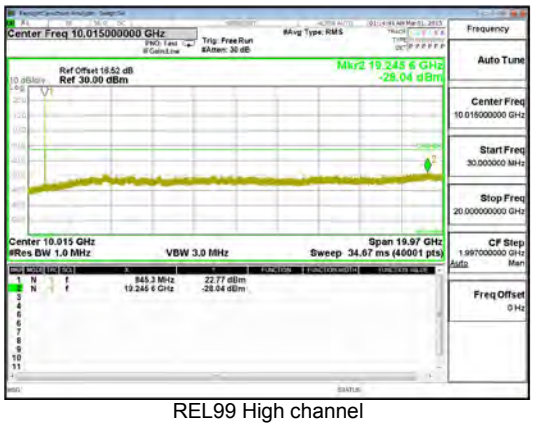
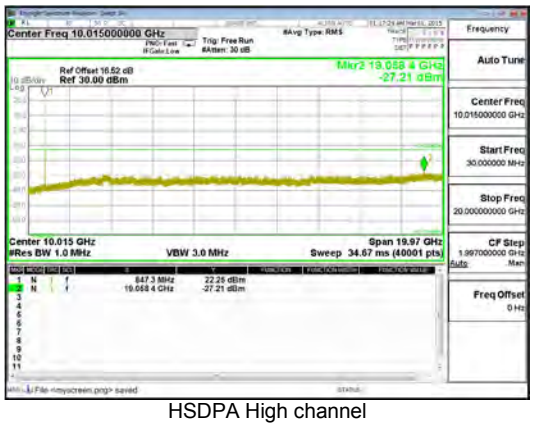
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

GSM 1900

Band 1900	 GPRS Low channel	 EGPRS Low channel
	 GPRS Mid channel	 EGPRS Mid channel
	 GPRS High channel	 EGPRS High channel

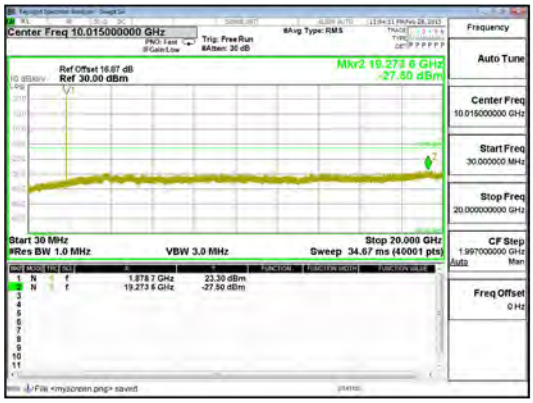
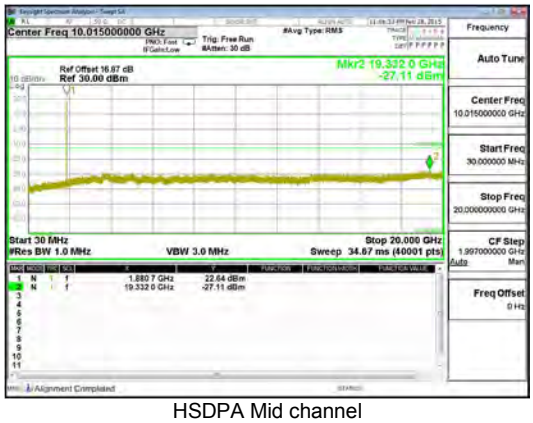
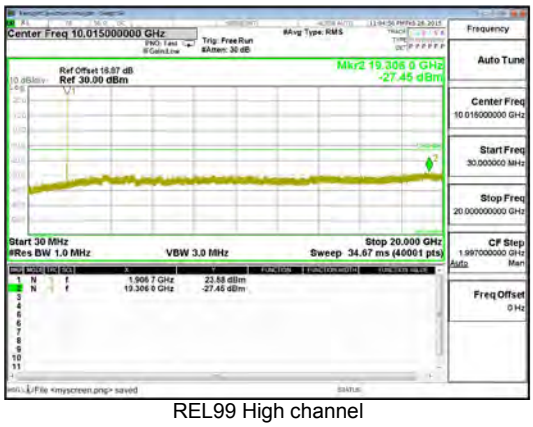
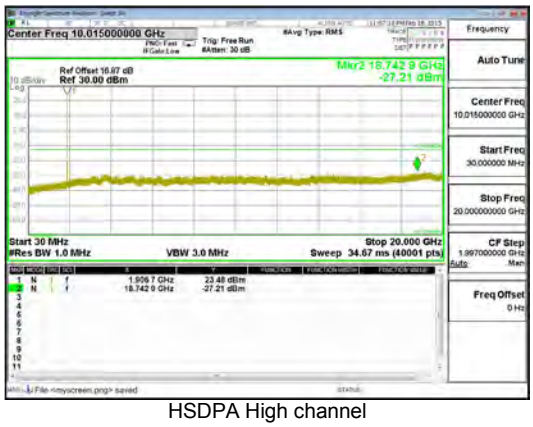
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 5

Band 5	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

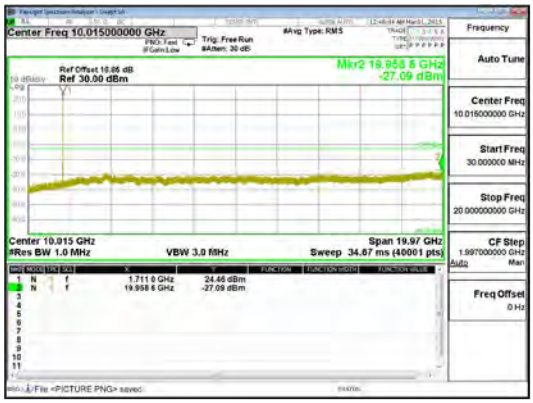
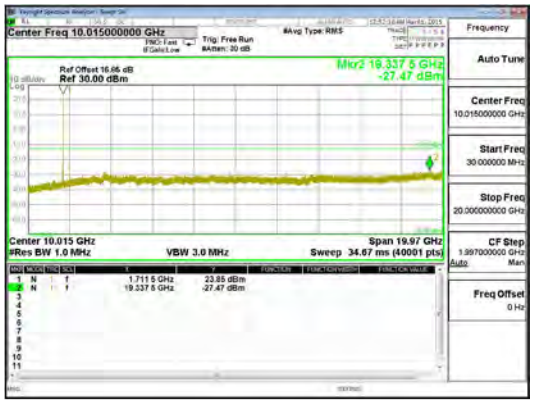
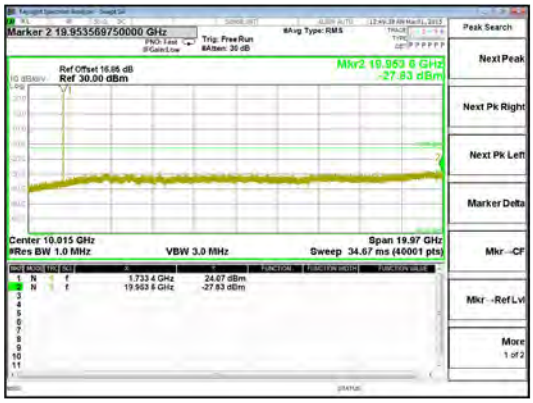
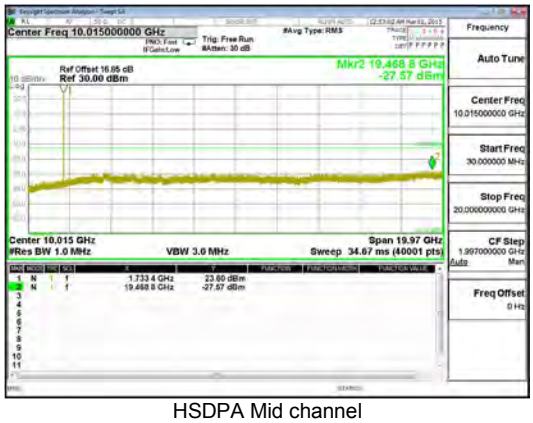
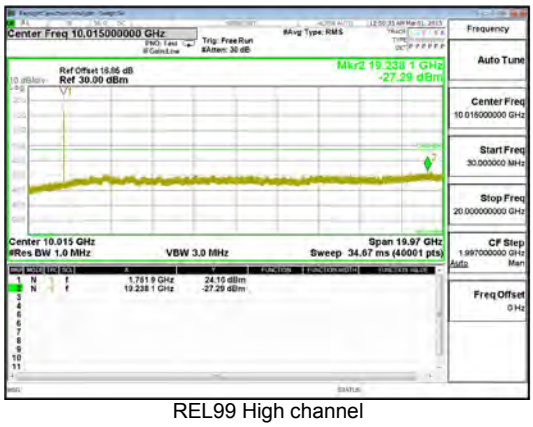
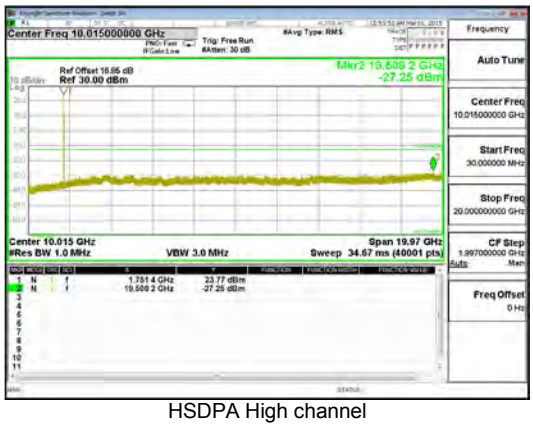
UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 2

Band 2	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

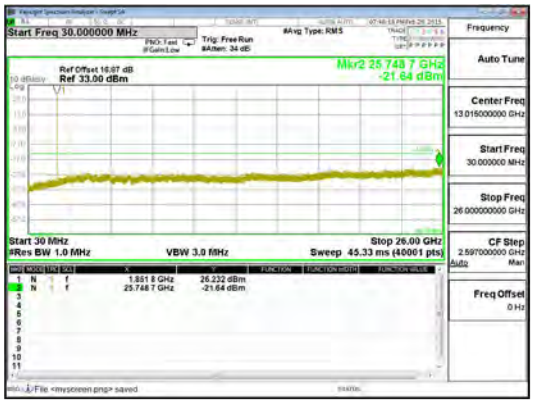
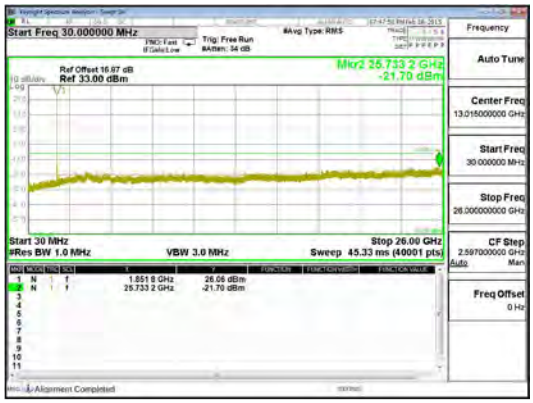
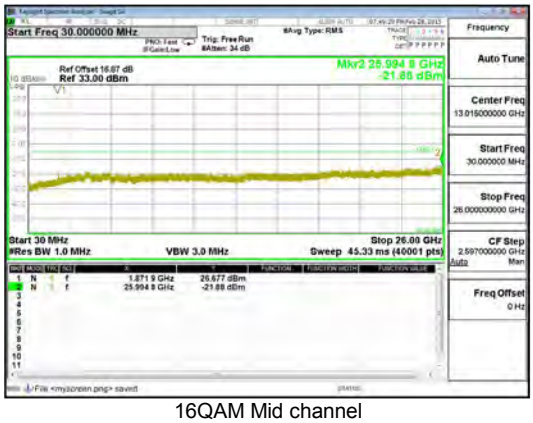
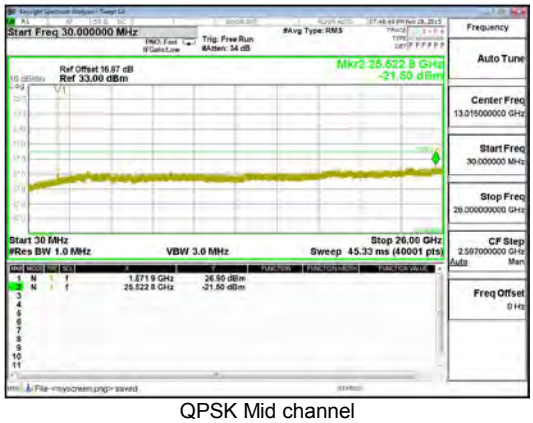
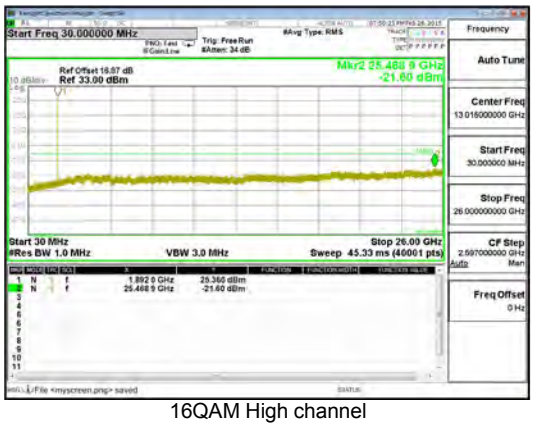
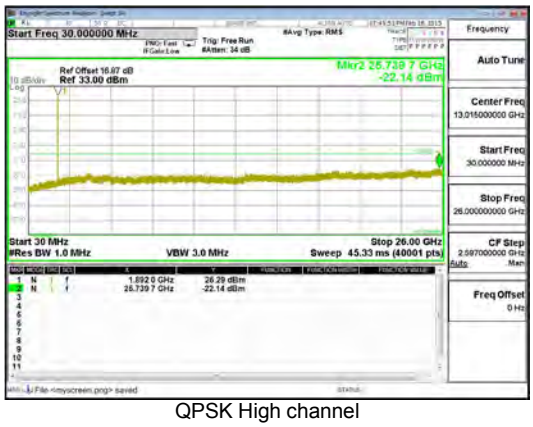
UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 4

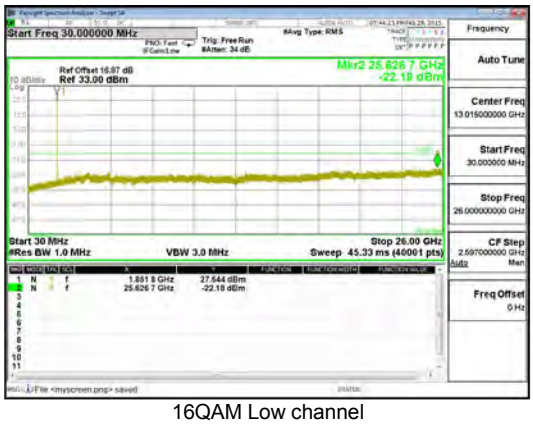
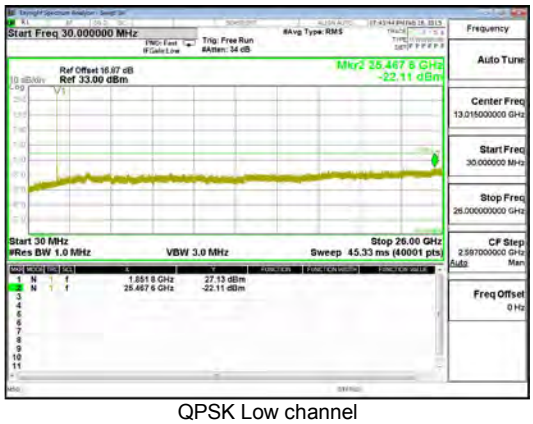
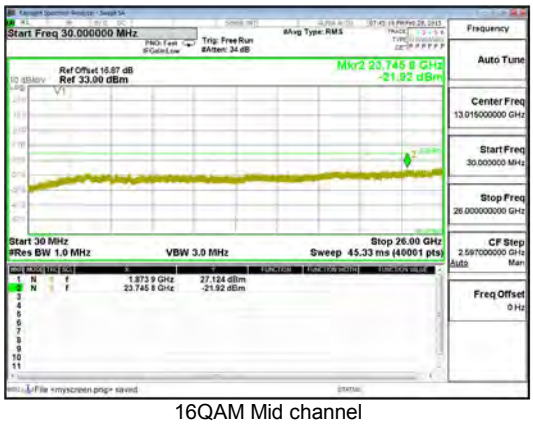
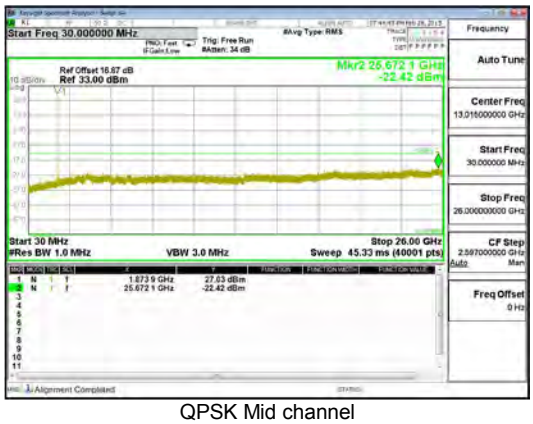
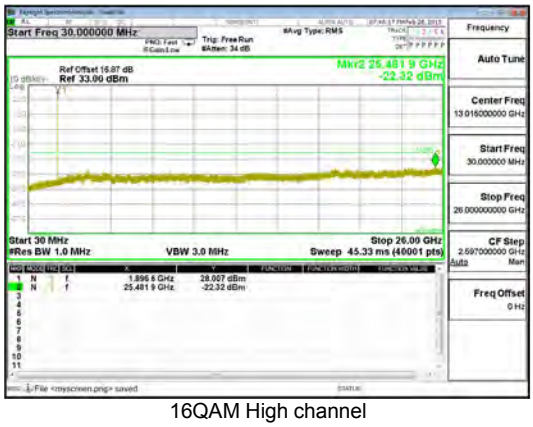
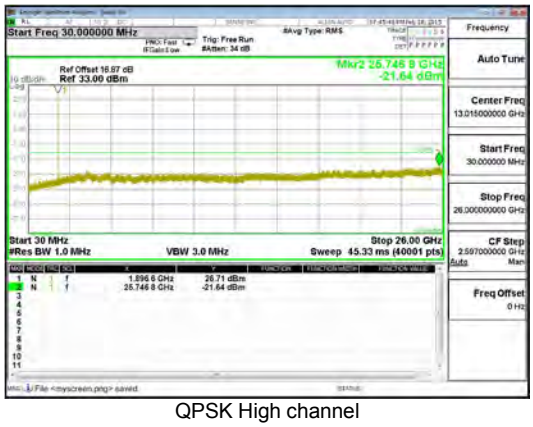
Band 4	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

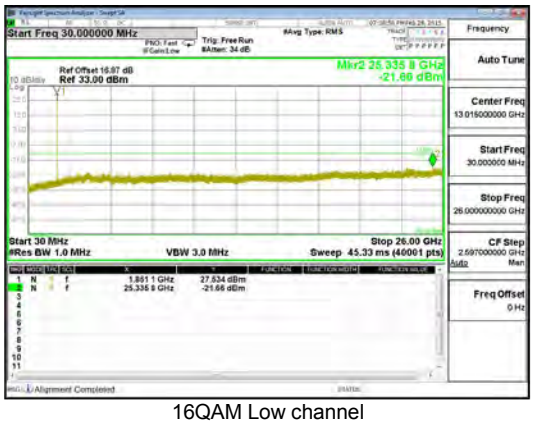
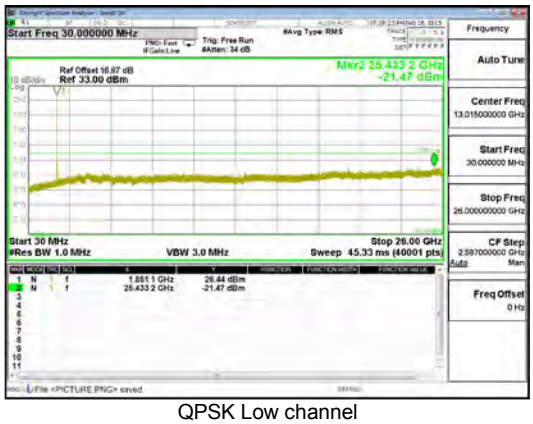
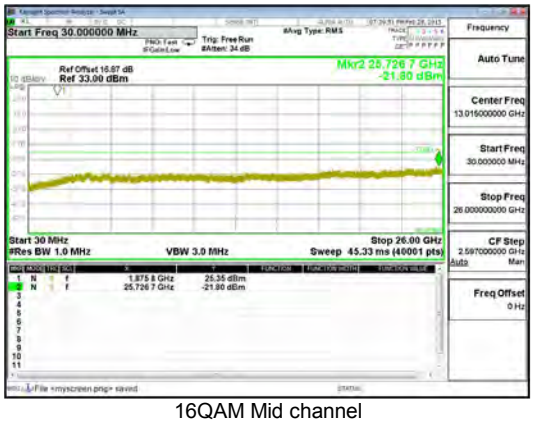
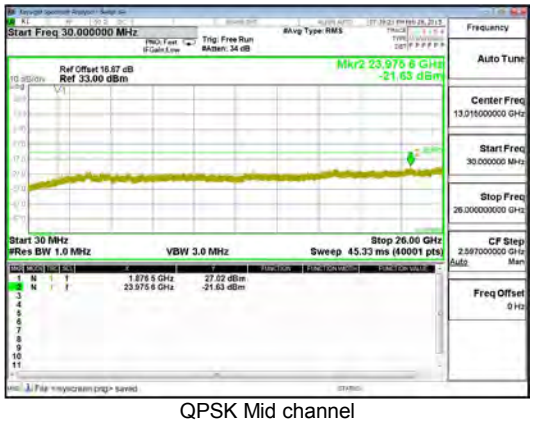
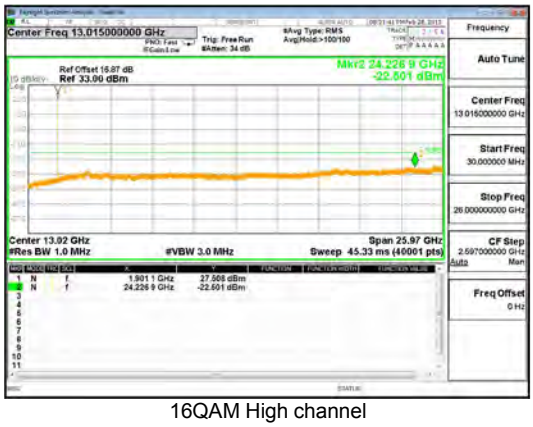
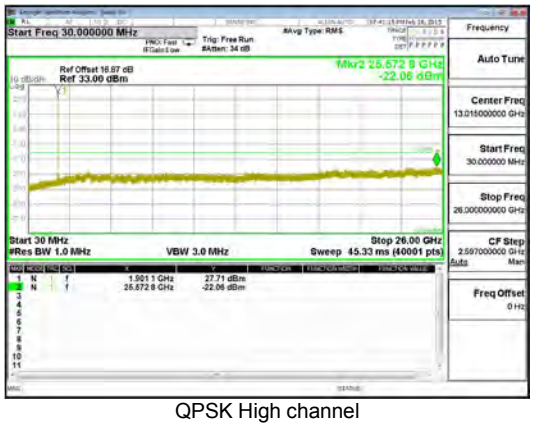
LTE Band 2

Band 2 20MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

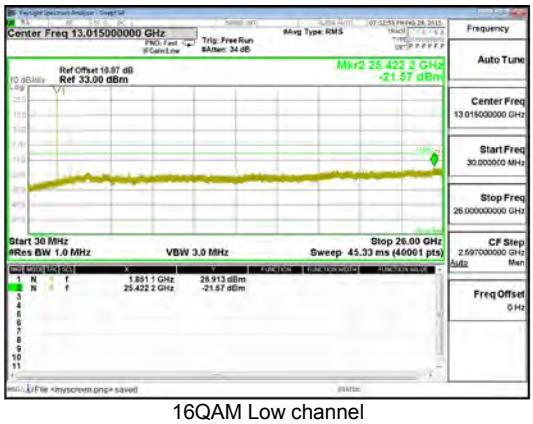
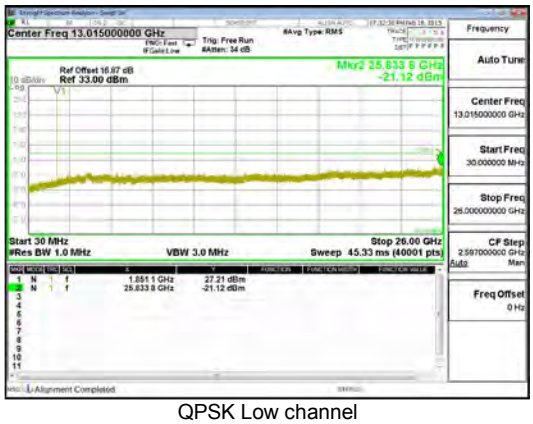
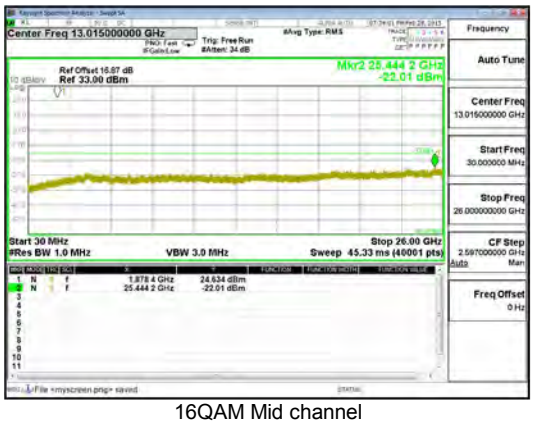
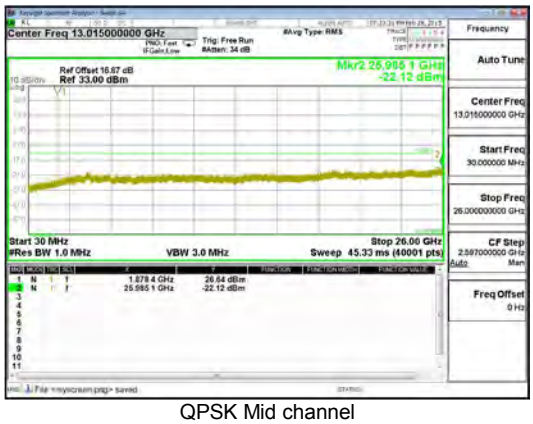
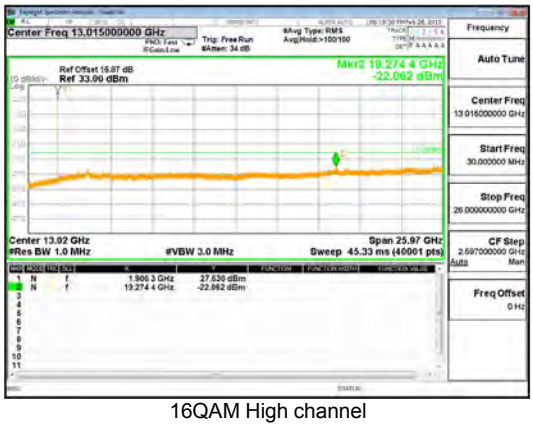
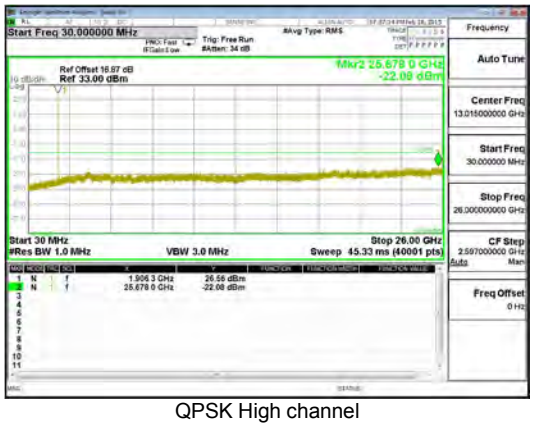
UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 2 15MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

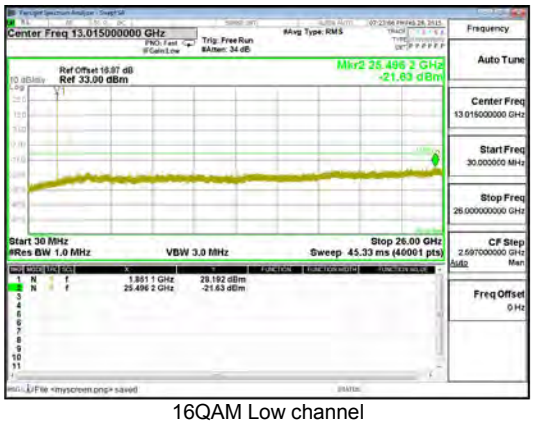
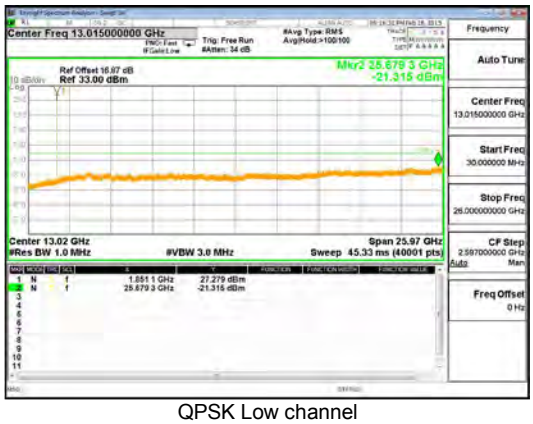
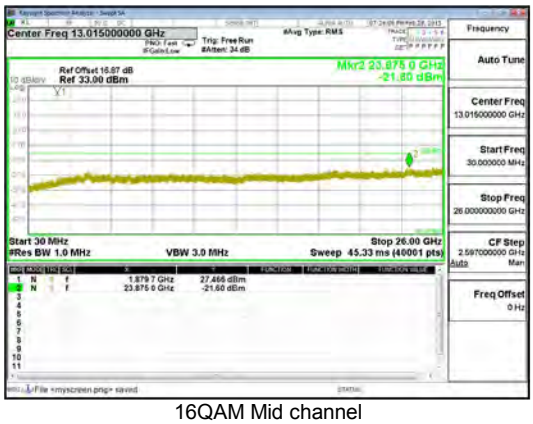
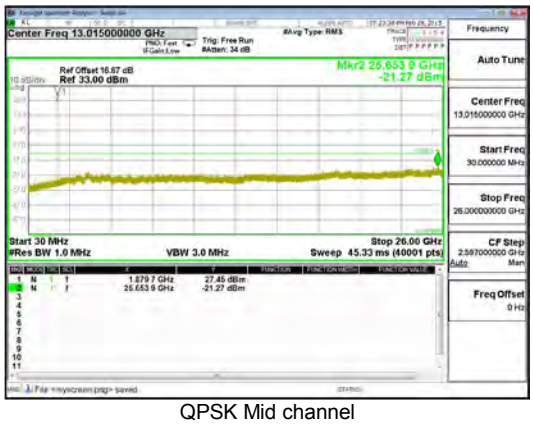
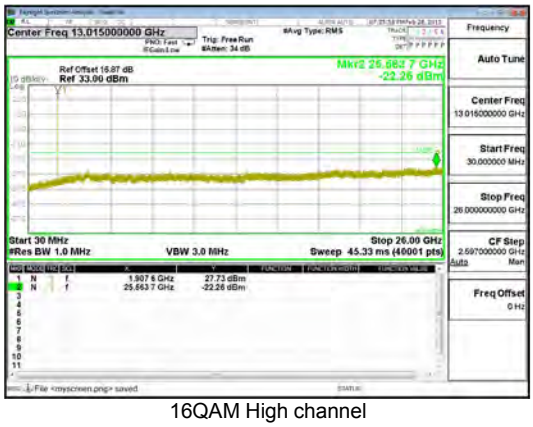
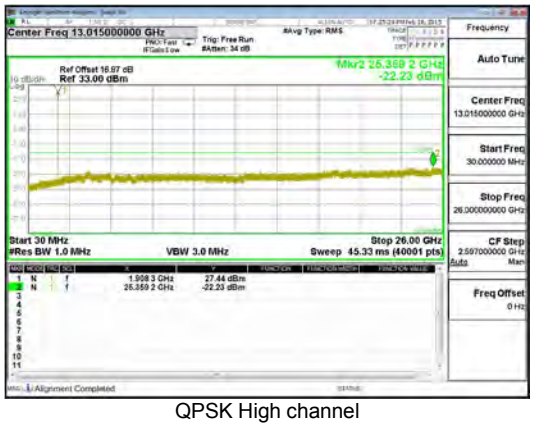
UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 2 10MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

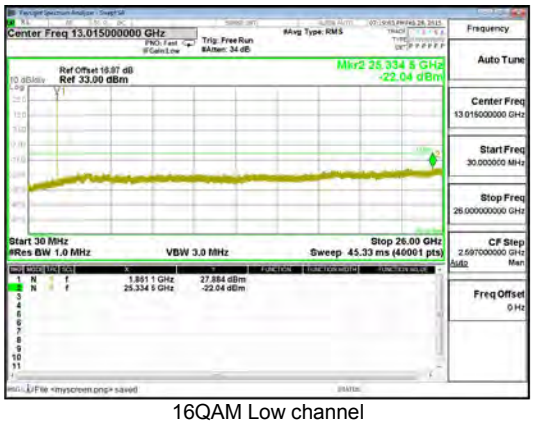
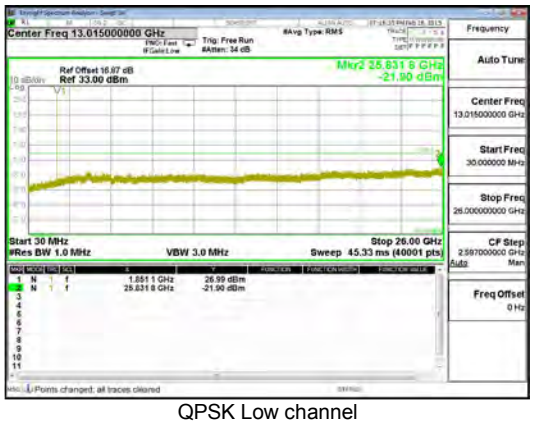
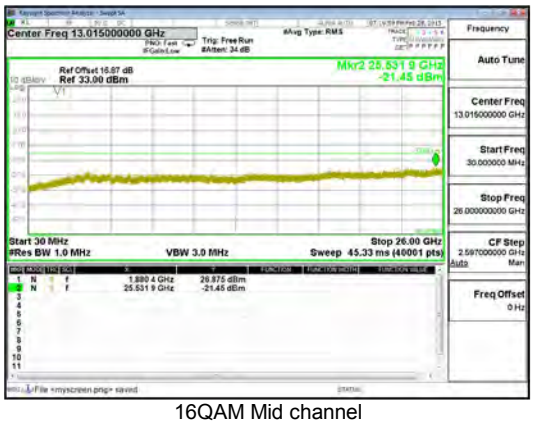
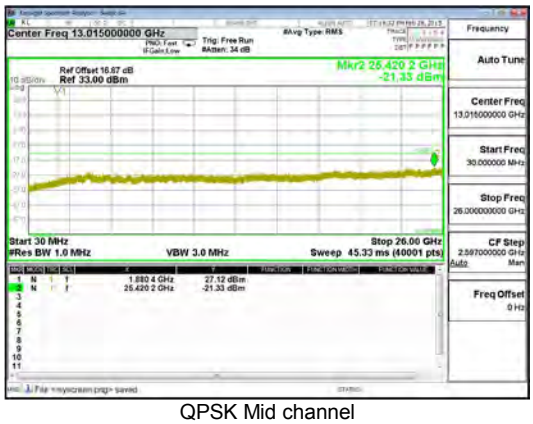
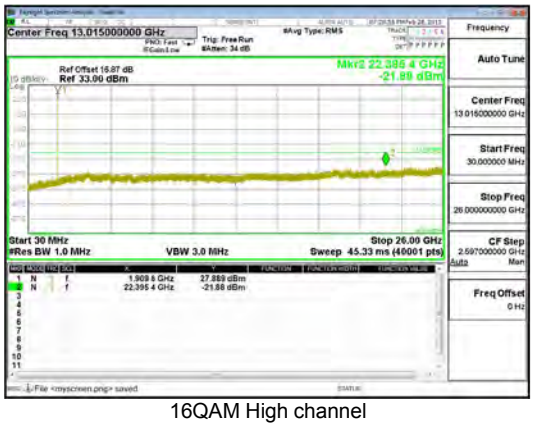
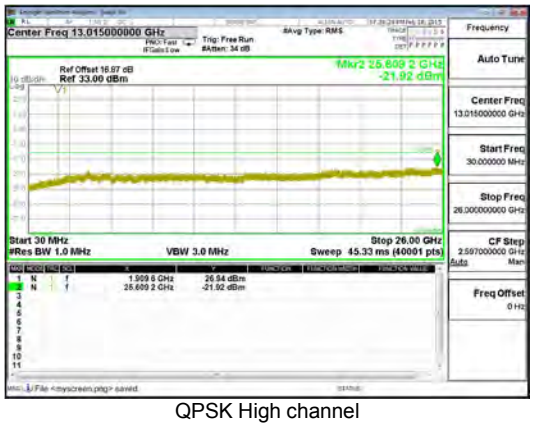
UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 2 5MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

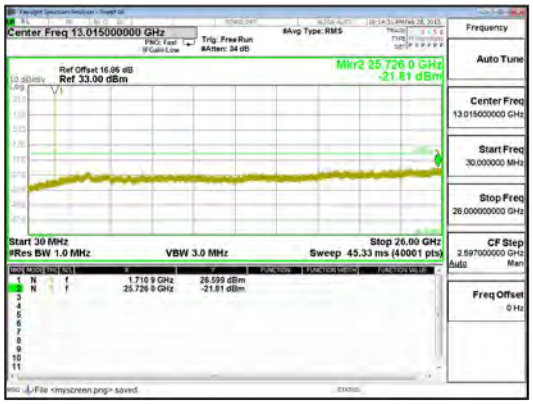
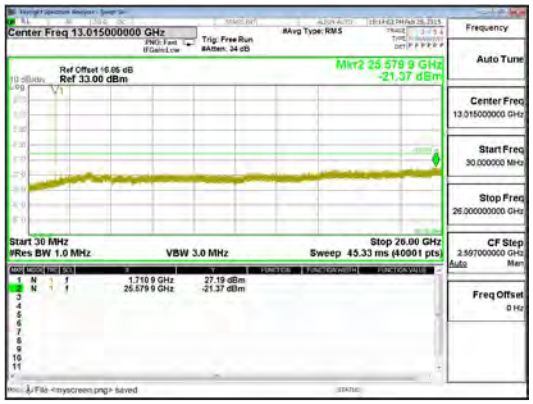
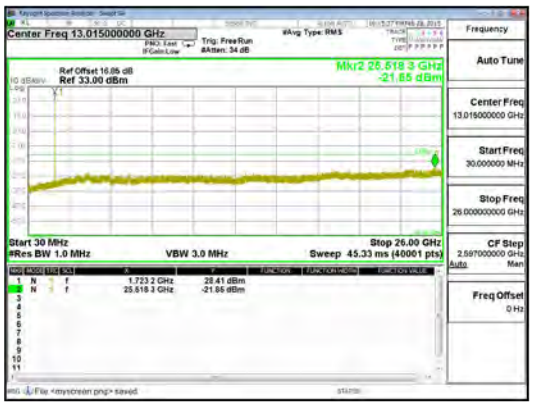
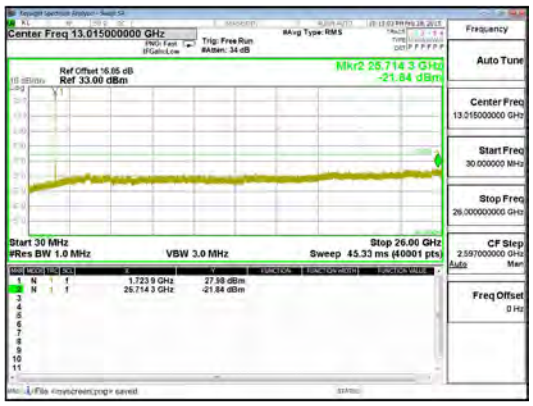
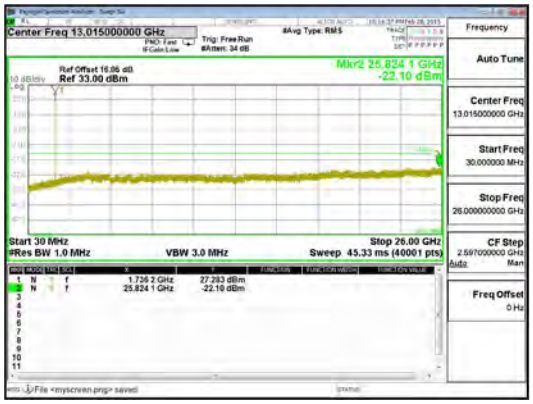
Band 2 3MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

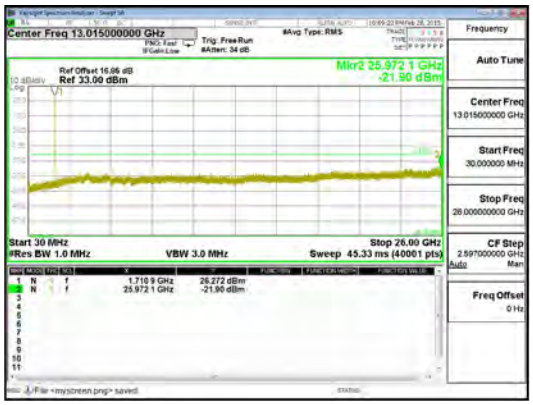
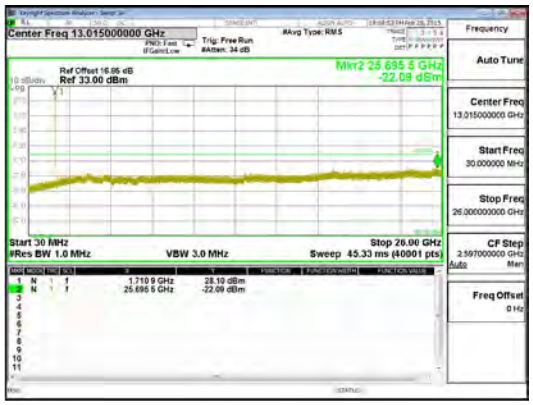
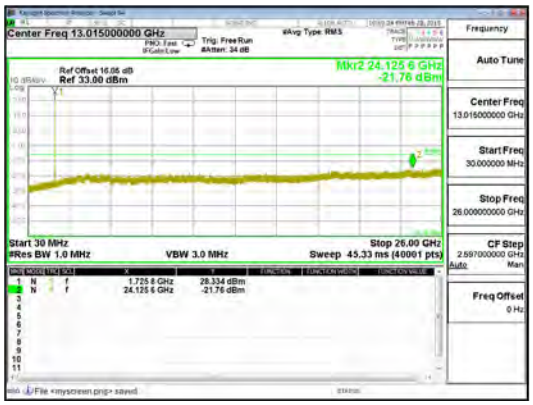
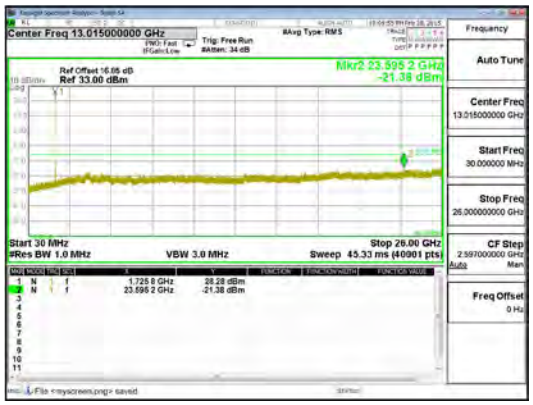
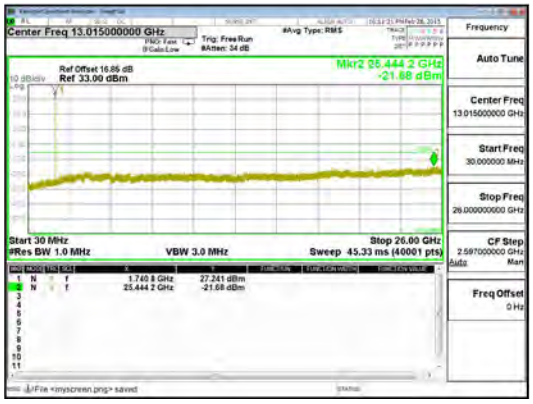
Band 2 1.4MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

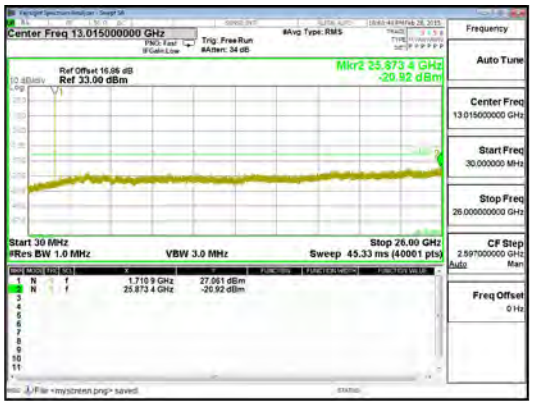
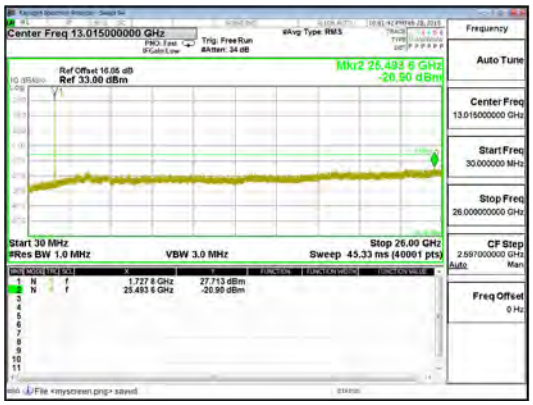
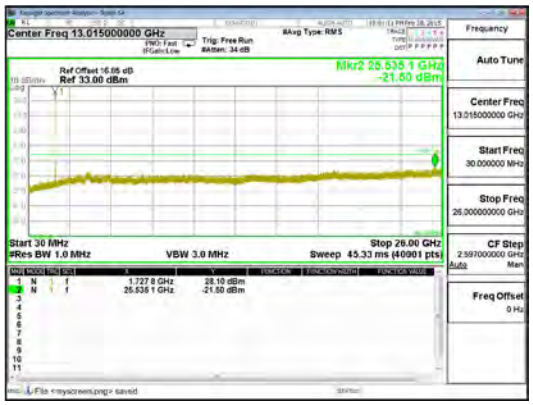
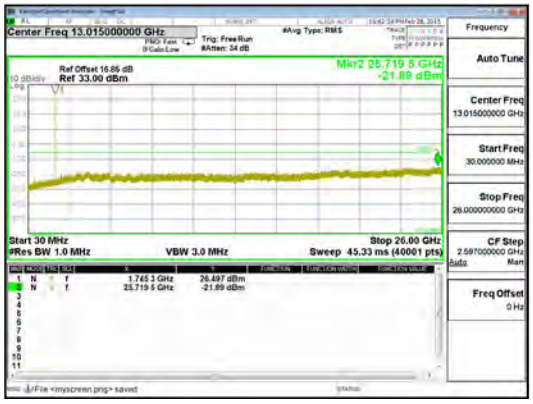
LTE Band 4

Band 4 20MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

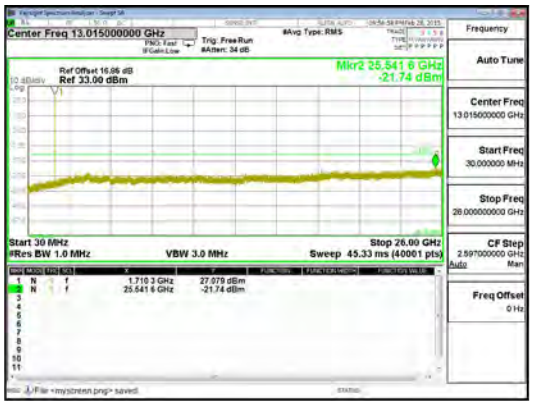
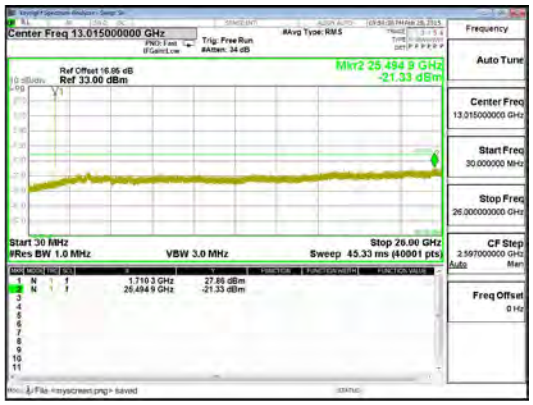
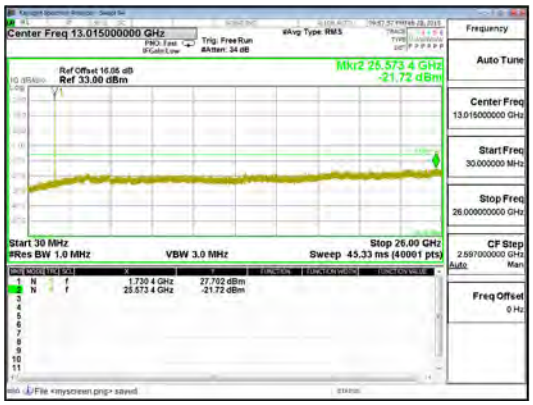
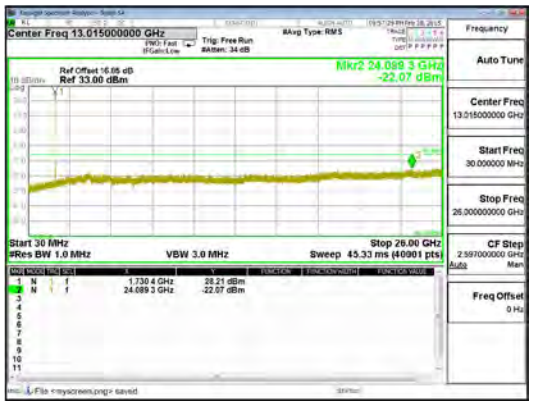
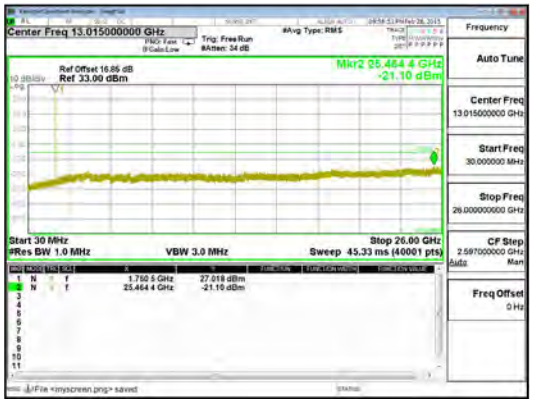
UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 15MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

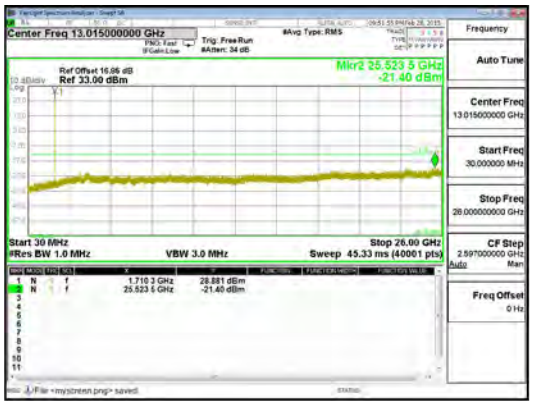
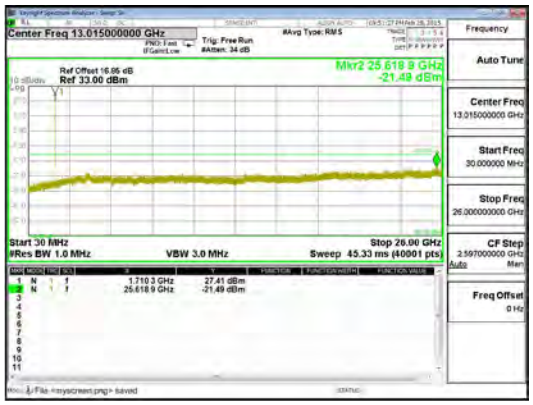
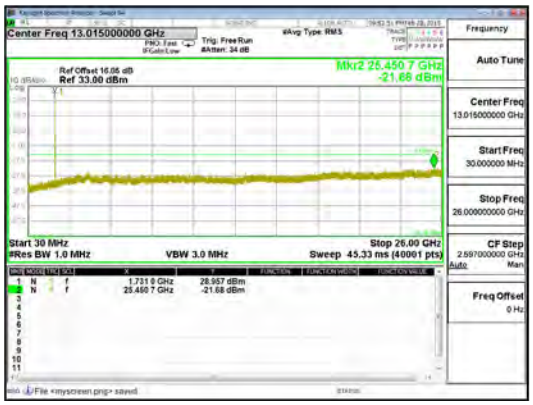
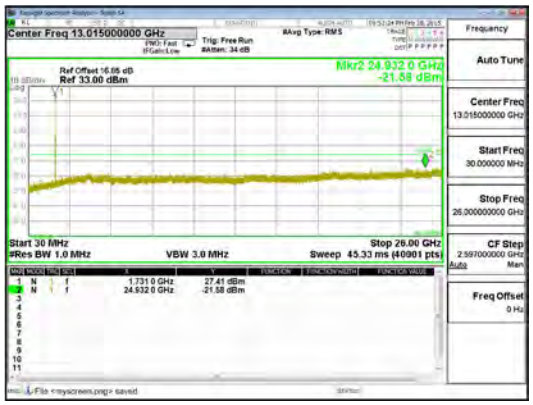
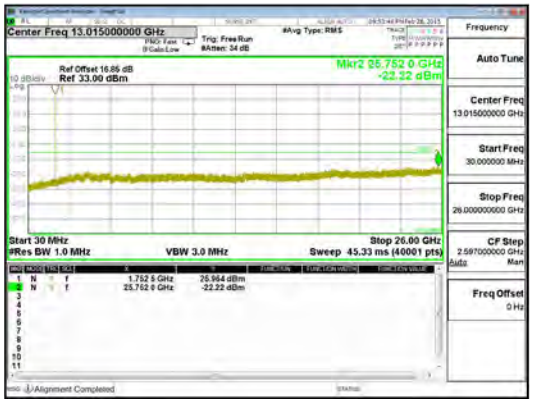
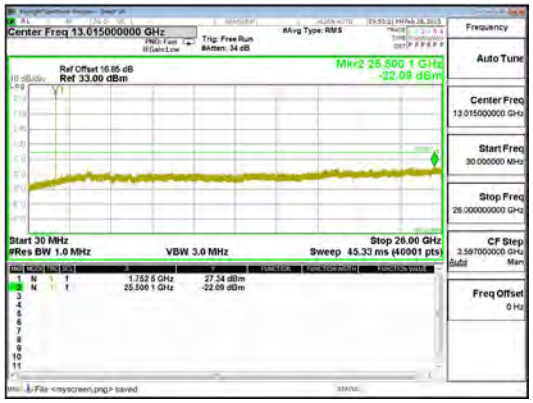
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 10MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

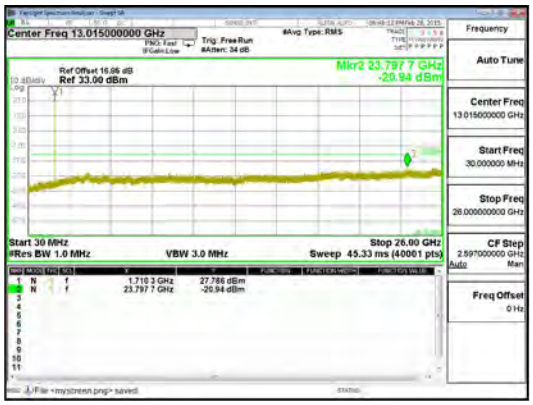
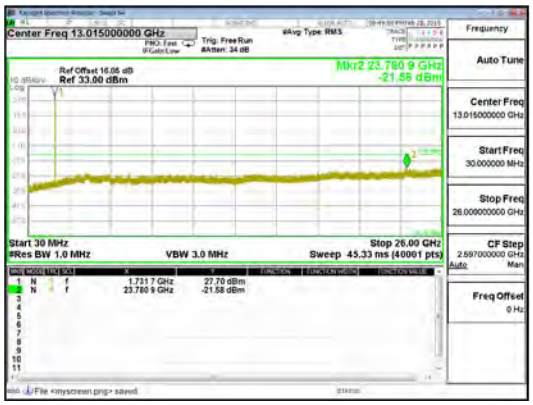
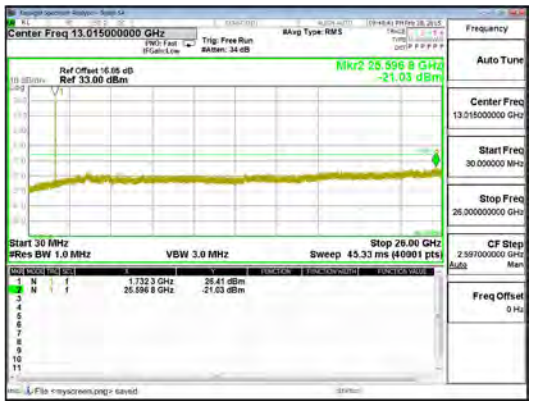
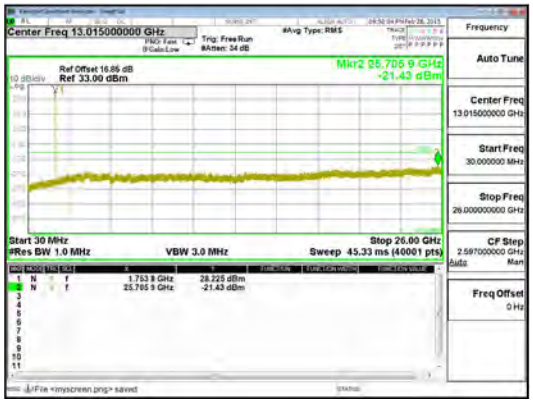
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 5MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 3MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

Band 4 1.4MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

10.1. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235

LIMITS

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

§24.235 - The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

RESULTS

See the following pages.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

10.1.1. FREQUENCY STABILITY RESULTS

WCDMA Band 5, Channel 4183, Frequency 836.6 MHz

Reference Frequency: WCDMA Band 5 Mid Channel 836.6 MHz @ 20ºC Limit: +- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.59999794	-0.001	2.5
3.80	40	836.60000240	-0.007	2.5
3.80	30	836.59999762	-0.001	2.5
3.80	***20***	836.59999691	***0***	***2.5***
3.80	10	836.60000358	-0.008	2.5
3.80	0	836.59999618	0.001	2.5
3.80	-10	836.59999786	-0.001	2.5
3.80	-20	836.60000191	-0.006	2.5
3.80	-30	836.59999629	0.001	2.5

Reference Frequency: WCDMA Band 5 Mid Channel 836.6 MHz @ 20ºC Limit: +- 2.5 ppm = 2091.250 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	**836.59999691**	***0***	***2.5***
4.20	20	836.60000240	-0.007	2.5
3.40	20	836.60000207	-0.006	2.5

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 2, Channel 9400, Frequency 1880 MHz

Reference Frequency: WCDMA Band 2 Mid Channel 1880 MHz @ 20ºC Limit: +- 2.5 ppm = 4700.000 Hz				
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (*C)	(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1880.00000388	-0.005	2.5
3.80	40	1879.99999479	0.000	2.5
3.80	30	1879.99999613	-0.001	2.5
3.80	***20***	1879.99999477	***0***	***2.5***
3.80	10	1879.99999559	0.000	2.5
3.80	0	1879.99999668	-0.001	2.5
3.80	-10	1880.00000411	-0.005	2.5
3.80	-20	1879.99999554	0.000	2.5
3.80	-30	1879.99999391	0.000	2.5

Reference Frequency: WCDMA Band 2 Mid Channel 1880 MHz @ 20ºC Limit: +- 2.5 ppm = 4700.000 Hz				
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (*C)	(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	**1879.99999477**	***0***	***2.5***
4.20	20	1880.00000325	-0.005	2.5
3.40	20	1879.99999592	-0.001	2.5

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA Band 4, Channel 1413, Frequency 1732.6 MHz

Reference Frequency: WCDMA Band 4 Mid Channel 1732.6 MHz @ 20ºC Limit: +- 2.5 ppm = 4331.500 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1732.60000343	0.000	2.5
3.80	40	1732.59999707	0.004	2.5
3.80	30	1732.60000412	0.000	2.5
3.80	***20***	1732.60000358	***0***	***2.5***
3.80	10	1732.60000319	0.000	2.5
3.80	0	1732.59999429	0.005	2.5
3.80	-10	1732.60000282	0.000	2.5
3.80	-20	1732.59999608	0.004	2.5
3.80	-30	1732.60000491	-0.001	2.5

Reference Frequency: WCDMA Band 4 Mid Channel 1732.6 MHz @ 20ºC Limit: +- 2.5 ppm = 4331.500 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	**1732.60000358**	***0***	***2.5***
4.20	20	1732.59999614	0.004	2.5
3.40	20	1732.60000434	0.000	2.5

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

11. RADIATED TEST RESULTS

11.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232

LIMITS

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

24.232(c) - Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13dB.

TEST PROCEDURE

ANSI / TIA / EIA 603C Clause 2.2.17; MXA setting reference to 971168 D01 v02r02

For peak power measurement with a PSA:

a) Set the RBW ≥ OBW; b) Set VBW ≥ 3 × RBW; c) Set span ≥ 2 x RBW; d) Sweep time = auto couple; e) Detector = peak; f) Ensure that the number of measurement points ≥ span/RBW; g) Trace mode = max hold;

For average power measurement with a PSA:

a) Set span to at least 1.5 times the OBW; b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz; c) Set VBW ≥ 3 x RBW; d) Set number of points in sweep ≥ 2 × span / RBW; e) Sweep time = auto-couple; f) Detector = RMS (power averaging); g) Use free run trigger If burst duty cycle ≥ 98; h) Use trigger to capture bursts If burst duty cycle < 98; i) Trace average at least 100 traces in power averaging (*i.e.*, RMS) mode. j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function.

TEST RESULTS

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

11.1.1. ERP/EIRP Results

GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	512	824.2	27.34	541.4
		661	836.6	29.07	806.3
		810	848.8	26.98	498.5
	EGPRS	512	824.2	23.23	210.1
		661	836.6	23.05	201.6
		810	848.8	22.50	177.7
GSM1900	GPRS	512	1850.2	29.34	858.6
		661	1880.0	31.03	1267.7
		810	1909.8	30.10	1024.0
	EGPRS	512	1850.2	23.39	218.2
		661	1880.0	22.71	186.6
		810	1909.8	21.55	143.0

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	18.28	67.2
		4183	836.6	17.65	58.1
		4233	846.6	17.28	53.4
	HSDPA	4132	826.4	16.38	43.4
		4183	836.6	16.15	41.2
		4233	846.6	17.32	53.9
Band 2	REL99	9262	1852.4	29.14	820.0
		9400	1880.0	30.24	1056.8
		9538	1907.6	27.88	614.2
	HSDPA	9262	1852.4	19.97	99.3
		9400	1880.0	23.23	210.4
		9538	1907.6	21.54	142.7
Band 4	REL99	1312	1712.4	25.59	362.1
		1413	1732.6	25.68	369.8
		1513	1752.6	24.88	307.8
	HSDPA	1312	1712.4	23.67	232.7
		1413	1732.6	24.53	283.8
		1513	1752.6	24.71	296.0

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE 2

Band	BW (MHz)	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 2	20	QPSK	100/0	1860.0	23.81	240.3
			100/0	1880.0	23.47	222.3
			100/0	1900.0	24.13	258.6
		16QAM	100/0	1860.0	22.78	189.6
			100/0	1880.0	22.44	175.3
			100/0	1900.0	23.15	206.3
	15	QPSK	75/0	1857.5	23.01	199.9
			75/0	1880.0	23.47	222.3
			75/0	1902.5	24.13	258.6
		16QAM	75/0	1857.5	21.58	143.8
			75/0	1880.0	22.34	171.4
			75/0	1902.5	22.68	185.2
	10	QPSK	50/0	1955.0	23.07	202.7
			50/0	1880.0	23.47	222.3
			50/0	1905.0	24.58	286.8
		16QAM	50/0	1955.0	21.60	144.5
			50/0	1880.0	22.45	175.8
			50/0	1905.0	23.54	225.7
	5	QPSK	25/0	1852.5	23.13	205.5
			25/0	1880.0	22.30	169.8
			25/0	1907.5	23.64	231.0
		16QAM	25/0	1852.5	19.50	89.1
			25/0	1880.0	22.57	180.7
			25/0	1907.5	24.51	282.2
	3	QPSK	15/0	1815.5	18.55	71.6
			15/0	1880.0	20.67	116.7
			15/0	1908.5	24.64	290.8
		16QAM	15/0	1815.5	18.98	79.0
			15/0	1880.0	20.00	100.0
			15/0	1908.5	23.24	210.7
	1.4	QPSK	6/0	1850.7	17.41	55.1
			6/0	1880.0	19.00	79.4
			6/0	1909.3	21.39	137.6
		16QAM	6/0	1850.7	17.30	53.7
			6/0	1880.0	18.10	64.6
			6/0	1909.3	20.20	104.6

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE 4

Band	BW (MHz)	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 4	20	QPSK	100/0	1720.0	22.31	170.1
			100/0	1732.5	23.03	200.9
			100/0	1745.0	23.53	225.2
		16QAM	100/0	1720.0	21.06	127.6
			100/0	1732.5	22.14	163.6
			100/0	1745.0	22.05	160.2
	15	QPSK	75/0	1717.5	22.74	187.8
			75/0	1732.5	22.13	163.3
			75/0	1747.5	23.11	204.5
		16QAM	75/0	1717.5	21.24	133.0
			75/0	1732.5	21.45	139.6
			75/0	1747.5	22.51	178.1
	10	QPSK	50/0	1715.0	21.09	128.5
			50/0	1732.5	20.63	115.6
			50/0	1750.0	20.75	118.7
		16QAM	50/0	1715.0	20.29	106.9
			50/0	1732.5	19.97	99.3
			50/0	1750.0	20.00	99.9
	5	QPSK	25/0	1712.5	20.74	118.5
			25/0	1732.5	20.97	125.0
			25/0	1752.5	23.06	202.1
		16QAM	25/0	1712.5	19.75	94.4
			25/0	1732.5	20.17	104.0
			25/0	1752.5	21.88	154.0
	3	QPSK	15/0	1711.5	21.97	157.3
			15/0	1732.5	22.33	171.0
			15/0	1753.5	22.67	184.8
		16QAM	15/0	1711.5	21.01	126.1
			15/0	1732.5	21.35	136.4
			15/0	1753.5	21.67	146.8
	1.4	QPSK	6/0	1710.7	17.63	57.9
			6/0	1732.5	19.01	79.6
			6/0	1754.3	19.46	88.2
		16QAM	6/0	1710.7	16.31	42.7
			6/0	1732.5	18.03	63.5
			6/0	1754.3	18.76	75.1

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

11.1.2. ERP/EIRP DATA

GSM

Band
GSM850
GPRS

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-27-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: GPRS 850 MHz

Test Equipment:
Receiving: VULB9163-750, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	27.43	V	1.1	-1.6	24.81	38.5	-13.6	
824.20	29.96	H	1.1	-1.6	27.34	38.5	-11.1	
Mid Ch								
836.60	25.61	V	1.1	-1.4	23.12	38.5	-15.3	
836.60	31.56	H	1.1	-1.4	29.07	38.5	-9.4	
High Ch								
848.80	25.66	V	1.1	-1.3	23.30	38.5	-15.2	
848.80	29.34	H	1.1	-1.3	26.98	38.5	-11.5	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

GSM

Band
GSM850
EGPRS

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-27-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: GPRS 850 MHz

Test Equipment:
Receiving: VULB9163-750, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	16.99	V	1.1	-1.6	14.37	38.5	-24.1	
824.20	25.85	H	1.1	-1.6	23.23	38.5	-15.2	
Mid Ch								
836.60	18.68	V	1.1	-1.4	16.19	38.5	-22.3	
836.60	25.54	H	1.1	-1.4	23.05	38.5	-15.4	
High Ch								
848.80	20.33	V	1.1	-1.3	17.97	38.5	-20.5	
848.80	24.86	H	1.1	-1.3	22.50	38.5	-16.0	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

GSM

Band
GSM1900
GPRS

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-27-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: GPRS 1900MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	8.0	V	1.60	9.12	15.48	33.0	-17.5	
1850.20	21.8	H	1.60	9.12	29.34	33.0	-3.7	
Mid Ch								
1880.00	17.9	V	1.62	8.98	25.23	33.0	-7.8	
1880.00	23.7	H	1.62	8.98	31.03	33.0	-2.0	
High Ch								
1909.80	13.6	V	1.63	8.83	20.75	33.0	-12.2	
1909.80	22.9	H	1.63	8.83	30.10	33.0	-2.9	

Rev. 3.17.11

GSM

Band
GSM1900
EGPRS

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-27-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: EGPRS 1900MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	5.0	V	1.60	9.12	12.54	33.0	-20.5	
1850.20	15.9	H	1.60	9.12	23.39	33.0	-9.6	
Mid Ch								
1880.00	11.2	V	1.62	8.98	18.58	33.0	-14.4	
1880.00	15.4	H	1.62	8.98	22.71	33.0	-10.3	
High Ch								
1909.80	9.6	V	1.63	8.83	16.79	33.0	-16.2	
1909.80	14.4	H	1.63	8.83	21.55	33.0	-11.4	

Rev. 3.17.11

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA

Band 5
REL99

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-27-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: Rel 99_850 MHz

Test Equipment:
Receiving: VULB9163-750, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	14.70	V	1.1	-1.5	12.09	38.5	-26.4	
826.40	20.89	H	1.1	-1.5	18.28	38.5	-20.2	
Mid Ch								
836.60	14.76	V	1.1	-1.4	12.27	38.5	-26.2	
836.60	20.14	H	1.1	-1.4	17.65	38.5	-20.8	
High Ch								
846.60	15.10	V	1.1	-1.3	12.72	38.5	-25.7	
846.60	19.66	H	1.1	-1.3	17.28	38.5	-21.2	

Rev. 3.17.11

WCDMA

Band 5
HSDPA

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-27-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: HSDPA_850 MHz

Test Equipment:
Receiving: VULB9163-750, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	14.33	V	1.1	-1.5	11.72	38.5	-26.7	
826.40	18.99	H	1.1	-1.5	16.38	38.5	-22.1	
Mid Ch								
836.60	14.81	V	1.1	-1.4	12.32	38.5	-26.1	
836.60	18.64	H	1.1	-1.4	16.15	38.5	-22.3	
High Ch								
846.60	14.69	V	1.1	-1.3	12.31	38.5	-26.1	
846.60	19.70	H	1.1	-1.3	17.32	38.5	-21.1	

Rev. 3.17.11

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA

Band 2
REL99

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-27-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: REL99_1900 MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.40	9.64	V	1.60	9.12	17.16	33.0	-15.8	
1852.40	12.67	H	1.60	9.12	20.19	33.0	-12.8	
Mid Ch								
1880.00	11.58	V	1.62	8.98	18.94	33.0	-14.1	
1880.00	15.87	H	1.62	8.98	23.23	33.0	-9.8	
High Ch								
1907.60	7.85	V	1.63	8.83	15.05	33.0	-17.9	
1907.60	14.48	H	1.63	8.83	21.68	33.0	-11.3	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

WCDMA

Band 2
HSDPA

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-27-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: HSDPA_1900 MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.40	3.78	V	1.60	9.12	11.30	33.0	-21.7	
1852.40	12.45	H	1.60	9.12	19.97	33.0	-13.0	
Mid Ch								
1880.00	11.58	V	1.62	8.98	18.94	33.0	-14.1	
1880.00	15.87	H	1.62	8.98	23.23	33.0	-9.8	
High Ch								
1907.60	7.31	V	1.63	8.83	14.51	33.0	-18.5	
1907.60	14.34	H	1.63	8.83	21.54	33.0	-11.5	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA

Band 4
REL99

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-27-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, Z Position
Mode: Rel 99_1700 MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1712.40	16.82	V	1.60	9.12	24.34	33.0	-8.7	
1712.40	18.07	H	1.60	9.12	25.59	33.0	-7.4	
Mid Ch								
1732.60	16.67	V	1.62	8.98	24.03	33.0	-9.0	
1732.60	18.32	H	1.62	8.98	25.68	33.0	-7.3	
High Ch								
1752.60	16.63	V	1.63	8.83	23.83	33.0	-9.2	
1752.60	17.68	H	1.63	8.83	24.88	33.0	-8.1	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

WCDMA

Band 4
HSDPA

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-27-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, Z Position
Mode: HSDPA_1700 MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1712.40	16.15	V	1.60	9.12	23.67	33.0	-9.3	
1712.40	16.11	H	1.60	9.12	23.63	33.0	-9.4	
Mid Ch								
1732.60	17.17	V	1.62	8.98	24.53	33.0	-8.5	
1732.60	14.39	H	1.62	8.98	21.75	33.0	-11.3	
High Ch								
1752.60	17.35	V	1.63	8.83	24.55	33.0	-8.4	
1752.60	17.51	H	1.63	8.83	24.71	33.0	-8.3	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2
20MHz
QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-28-15
Test Engineer: Steven.Kim
Configuration: EUT / X-Position
Mode: LTE Band 2 QPSK, 20MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1860.00	14.87	V	1.9	9.8	22.81	33.0	-10.2	
1860.00	15.87	H	1.9	9.8	23.81	33.0	-9.2	
Mid Ch								
1880.00	15.56	V	1.9	9.8	23.47	33.0	-9.5	
1880.00	14.69	H	1.9	9.8	22.60	33.0	-10.4	
High Ch								
1900.00	16.24	V	1.9	9.8	24.13	33.0	-8.9	
1900.00	15.20	H	1.9	9.8	23.09	33.0	-9.9	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

LTE

Band 2
20MHz
16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-28-15
Test Engineer: Steven.Kim
Configuration: EUT / X-Position
Mode: LTE Band 2 16QAM, 20MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1860.00	13.88	V	1.9	9.8	21.82	33.0	-11.2	
1860.00	14.84	H	1.9	9.8	22.78	33.0	-10.2	
Mid Ch								
1880.00	14.53	V	1.9	9.8	22.44	33.0	-10.6	
1880.00	13.69	H	1.9	9.8	21.60	33.0	-11.4	
High Ch								
1900.00	15.26	V	1.9	9.8	23.15	33.0	-9.9	
1900.00	14.15	H	1.9	9.8	22.04	33.0	-11.0	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2
15MHz
QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-28-15
Test Engineer: Steven.Kim
Configuration: EUT / X-Position
Mode: LTE Band 2 QPSK, 15MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1857.50	14.96	V	1.9	9.8	22.90	33.0	-10.1	
1857.50	15.07	H	1.9	9.8	23.01	33.0	-10.0	
Mid Ch								
1880.00	15.39	V	1.9	9.8	23.30	33.0	-9.7	
1880.00	15.56	H	1.9	9.8	23.47	33.0	-9.5	
High Ch								
1902.50	16.02	V	1.9	9.8	23.91	33.0	-9.1	
1902.50	16.24	H	1.9	9.8	24.13	33.0	-8.9	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

LTE

Band 2
15MHz
16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-28-15
Test Engineer: Steven.Kim
Configuration: EUT / X-Position
Mode: LTE Band 2 16QAM, 15MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1857.50	13.62	V	1.9	9.8	21.56	33.0	-11.4	
1857.50	13.64	H	1.9	9.8	21.58	33.0	-11.4	
Mid Ch								
1880.00	14.11	V	1.9	9.8	22.02	33.0	-11.0	
1880.00	14.43	H	1.9	9.8	22.34	33.0	-10.7	
High Ch								
1902.50	14.55	V	1.9	9.8	22.44	33.0	-10.6	
1902.50	14.79	H	1.9	9.8	22.68	33.0	-10.3	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2
10MHz
QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-28-15
Test Engineer: Steven.Kim
Configuration: EUT / X-Position
Mode: LTE Band 2 QPSK, 10MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1855.00	14.46	V	1.9	9.8	22.40	33.0	-10.6	
1855.00	15.13	H	1.9	9.8	23.07	33.0	-9.9	
Mid Ch								
1880.00	14.72	V	1.9	9.8	22.63	33.0	-10.4	
1880.00	15.56	H	1.9	9.8	23.47	33.0	-9.5	
High Ch								
1905.00	16.23	V	1.9	9.8	24.12	33.0	-8.9	
1905.00	16.69	H	1.9	9.8	24.58	33.0	-8.4	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

LTE

Band 2
10MHz
16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-28-15
Test Engineer: Steven.Kim
Configuration: EUT / X-Position
Mode: LTE Band 2 16QAM, 10MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1855.00	13.25	V	1.9	9.8	21.19	33.0	-11.8	
1855.00	13.66	H	1.9	9.8	21.60	33.0	-11.4	
Mid Ch								
1880.00	13.29	V	1.9	9.8	21.20	33.0	-11.8	
1880.00	14.54	H	1.9	9.8	22.45	33.0	-10.6	
High Ch								
1905.00	15.13	V	1.9	9.8	23.02	33.0	-10.0	
1905.00	15.65	H	1.9	9.8	23.54	33.0	-9.5	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2
5MHz
QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-28-15
Test Engineer: Steven.Kim
Configuration: EUT / X-Position
Mode: LTE Band 2 QPSK, 5MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.50	10.61	V	1.9	9.8	18.55	33.0	-14.5	
1852.50	15.19	H	1.9	9.8	23.13	33.0	-9.9	
Mid Ch								
1880.00	13.73	V	1.9	9.8	21.64	33.0	-11.4	
1880.00	14.39	H	1.9	9.8	22.30	33.0	-10.7	
High Ch								
1907.50	15.75	V	1.9	9.8	23.64	33.0	-9.4	
1907.50	14.72	H	1.9	9.8	22.61	33.0	-10.4	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

LTE

Band 2
5MHz
16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-28-15
Test Engineer: Steven.Kim
Configuration: EUT / X-Position
Mode: LTE Band 2 16QAM, 5MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.50	11.56	V	1.9	9.8	19.50	33.0	-13.5	
1852.50	16.18	H	1.9	9.8	24.12	33.0	-8.9	
Mid Ch								
1880.00	14.66	V	1.9	9.8	22.57	33.0	-10.4	
1880.00	15.15	H	1.9	9.8	23.06	33.0	-9.9	
High Ch								
1907.50	16.62	V	1.9	9.8	24.51	33.0	-8.5	
1907.50	15.58	H	1.9	9.8	23.47	33.0	-9.5	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2
3MHz
QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-28-15
Test Engineer: Steven.Kim
Configuration: EUT / X-Position
Mode: LTE Band 2 QPSK, 3MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1815.50	10.61	V	1.9	9.8	18.55	33.0	-14.5	
1815.50	11.25	H	1.9	9.8	19.19	33.0	-13.8	
Mid Ch								
1880.00	12.76	V	1.9	9.8	20.67	33.0	-12.3	
1880.00	13.20	H	1.9	9.8	21.11	33.0	-11.9	
High Ch								
1908.50	16.75	V	1.9	9.8	24.64	33.0	-8.4	
1908.50	14.56	H	1.9	9.8	22.45	33.0	-10.6	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

LTE

Band 2
3MHz
16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-28-15
Test Engineer: Steven.Kim
Configuration: EUT / X-Position
Mode: LTE Band 2 16QAM, 3MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1851.50	10.44	V	1.9	9.8	18.38	33.0	-14.6	
1851.50	11.04	H	1.9	9.8	18.98	33.0	-14.0	
Mid Ch								
1880.00	12.09	V	1.9	9.8	20.00	33.0	-13.0	
1880.00	12.09	H	1.9	9.8	20.00	33.0	-13.0	
High Ch								
1908.50	15.35	V	1.9	9.8	23.24	33.0	-9.8	
1908.50	13.48	H	1.9	9.8	21.37	33.0	-11.6	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2
1.4MHz
QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-28-15
Test Engineer: Steven.Kim
Configuration: EUT / X-Position
Mode: LTE Band 2 QPSK, 1.4MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1850.70	6.46	V	1.9	9.8	14.40	33.0	-18.6	
1850.70	9.47	H	1.9	9.8	17.41	33.0	-15.6	
Mid Ch								
1880.00	7.13	V	1.9	9.8	15.04	33.0	-18.0	
1880.00	11.09	H	1.9	9.8	19.00	33.0	-14.0	
High Ch								
1909.30	13.50	V	1.9	9.8	21.39	33.0	-11.6	
1909.30	13.04	H	1.9	9.8	20.93	33.0	-12.1	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

LTE

Band 2
1.4MHz
16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 02-28-15
Test Engineer: Steven.Kim
Configuration: EUT / X-Position
Mode: LTE Band 2 16QAM, 1.4MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1850.70	6.34	V	1.9	9.8	14.28	33.0	-18.7	
1850.70	9.36	H	1.9	9.8	17.30	33.0	-15.7	
Mid Ch								
1880.00	6.08	V	1.9	9.8	13.99	33.0	-19.0	
1880.00	10.19	H	1.9	9.8	18.10	33.0	-14.9	
High Ch								
1909.30	12.31	V	1.9	9.8	20.20	33.0	-12.8	
1909.30	11.94	H	1.9	9.8	19.83	33.0	-13.2	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4
20MHz
QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / Z-Position
Mode: LTE Band 4, QPSK, 20MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1720.00	13.99	V	1.9	9.8	21.93	30.0	-8.1	
1720.00	14.37	H	1.9	9.8	22.31	30.0	-7.7	
Mid Ch								
1732.50	14.46	V	1.9	9.8	22.37	30.0	-7.6	
1732.50	15.12	H	1.9	9.8	23.03	30.0	-7.0	
High Ch								
1745.00	13.67	V	1.9	9.8	21.56	30.0	-8.4	
1745.00	15.64	H	1.9	9.8	23.53	30.0	-6.5	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

LTE

Band 4
20MHz
16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / Z-Position
Mode: LTE Band 4, 16QAM, 20MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1720.00	13.09	V	1.9	9.8	21.03	30.0	-9.0	
1720.00	13.12	H	1.9	9.8	21.06	30.0	-8.9	
Mid Ch								
1732.50	12.66	V	1.9	9.8	20.57	30.0	-9.4	
1732.50	14.23	H	1.9	9.8	22.14	30.0	-7.9	
High Ch								
1745.00	12.67	V	1.9	9.8	20.56	30.0	-9.4	
1745.00	14.16	H	1.9	9.8	22.05	30.0	-8.0	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4
15MHz
QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / Z-Position
Mode: LTE Band 4, QPSK, 15MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1717.50	13.47	V	1.9	9.8	21.41	30.0	-8.6	
1717.50	14.80	H	1.9	9.8	22.74	30.0	-7.3	
Mid Ch								
1732.50	13.16	V	1.9	9.8	21.07	30.0	-8.9	
1732.50	14.22	H	1.9	9.8	22.13	30.0	-7.9	
High Ch								
1747.50	13.62	V	1.9	9.8	21.51	30.0	-8.5	
1747.50	15.22	H	1.9	9.8	23.11	30.0	-6.9	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

LTE

Band 4
15MHz
16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / Z-Position
Mode: LTE Band 4, 16QAM, 15MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1717.50	12.47	V	1.9	9.8	20.41	30.0	-9.6	
1717.50	13.30	H	1.9	9.8	21.24	30.0	-8.8	
Mid Ch								
1732.50	11.76	V	1.9	9.8	19.67	30.0	-10.3	
1732.50	13.54	H	1.9	9.8	21.45	30.0	-8.6	
High Ch								
1747.50	12.72	V	1.9	9.8	20.61	30.0	-9.4	
1747.50	14.62	H	1.9	9.8	22.51	30.0	-7.5	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_15C
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea TEL: (031) 337-9902 FAX: (031) 213-5433
UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4
10MHz
QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / Z-Position
Mode: LTE Band 4, QPSK, 10MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1715.00	12.05	V	1.9	9.8	19.99	30.0	-10.0	
1715.00	13.15	H	1.9	9.8	21.09	30.0	-8.9	
Mid Ch								
1732.50	11.16	V	1.9	9.8	19.07	30.0	-10.9	
1732.50	12.72	H	1.9	9.8	20.63	30.0	-9.4	
High Ch								
1750.00	11.66	V	1.9	9.8	19.55	30.0	-10.5	
1750.00	12.86	H	1.9	9.8	20.75	30.0	-9.3	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

LTE

Band 4
10MHz
16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / Z-Position
Mode: LTE Band 4 16QAM, 10MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1715.00	10.95	V	1.9	9.8	18.89	30.0	-11.1	
1715.00	12.35	H	1.9	9.8	20.29	30.0	-9.7	
Mid Ch								
1732.50	9.96	V	1.9	9.8	17.87	30.0	-12.1	
1732.50	12.06	H	1.9	9.8	19.97	30.0	-10.0	
High Ch								
1750.00	11.26	V	1.9	9.8	19.15	30.0	-10.9	
1750.00	12.11	H	1.9	9.8	20.00	30.0	-10.0	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4
5MHz
QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / Z-Position
Mode: LTE Band 4, QPSK , 5MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1712.50	10.97	V	1.9	9.8	18.91	30.0	-11.1	
1712.50	12.80	H	1.9	9.8	20.74	30.0	-9.3	
Mid Ch								
1732.50	13.06	V	1.9	9.8	20.97	30.0	-9.0	
1732.50	12.92	H	1.9	9.8	20.83	30.0	-9.2	
High Ch								
1752.50	12.90	V	1.9	9.8	20.79	30.0	-9.2	
1752.50	15.17	H	1.9	9.8	23.06	30.0	-6.9	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

LTE

Band 4
5MHz
16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / Z-Position
Mode: LTE Band 4 16QAM, 5MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1712.50	9.97	V	1.9	9.8	17.91	30.0	-12.1	
1712.50	11.81	H	1.9	9.8	19.75	30.0	-10.3	
Mid Ch								
1732.50	12.26	V	1.9	9.8	20.17	30.0	-9.8	
1732.50	11.66	H	1.9	9.8	19.57	30.0	-10.4	
High Ch								
1752.50	12.20	V	1.9	9.8	20.09	30.0	-9.9	
1752.50	13.99	H	1.9	9.8	21.88	30.0	-8.1	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4
3MHz
QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / Z-Position
Mode: LTE Band 4, QPSK , 3MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1711.50	14.03	V	1.9	9.8	21.97	30.0	-8.0	
1711.50	3.98	H	1.9	9.8	11.92	30.0	-18.1	
Mid Ch								
1732.50	13.06	V	1.9	9.8	20.97	30.0	-9.0	
1732.50	14.42	H	1.9	9.8	22.33	30.0	-7.7	
High Ch								
1753.50	13.39	V	1.9	9.8	21.28	30.0	-8.7	
1753.50	14.78	H	1.9	9.8	22.67	30.0	-7.3	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

LTE

Band 4
3MHz
16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / Z-Position
Mode: LTE Band 4 16QAM, 3MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1711.50	13.07	V	1.9	9.8	21.01	30.0	-9.0	
1711.50	12.98	H	1.9	9.8	20.92	30.0	-9.1	
Mid Ch								
1732.50	12.06	V	1.9	9.8	19.97	30.0	-10.0	
1732.50	13.44	H	1.9	9.8	21.35	30.0	-8.7	
High Ch								
1753.50	12.39	V	1.9	9.8	20.28	30.0	-9.7	
1753.50	13.78	H	1.9	9.8	21.67	30.0	-8.3	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4
1.4MHz
QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / Z-Position
Mode: LTE Band 4 QPSK, 1.4MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1710.70	9.69	V	1.9	9.8	17.63	30.0	-12.4	
1710.70	9.39	H	1.9	9.8	17.33	30.0	-12.7	
Mid Ch								
1732.50	10.36	V	1.9	9.8	18.27	30.0	-11.7	
1732.50	11.10	H	1.9	9.8	19.01	30.0	-11.0	
High Ch								
1754.30	10.90	V	1.9	9.8	18.79	30.0	-11.2	
1754.30	11.57	H	1.9	9.8	19.46	30.0	-10.5	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

LTE

Band 4
1.4MHz
16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / Z-Position
Mode: LTE Band 4 16QAM, 1.4MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1710.70	7.69	V	1.9	9.8	15.63	30.0	-14.4	
1710.70	8.37	H	1.9	9.8	16.31	30.0	-13.7	
Mid Ch								
1732.50	9.36	V	1.9	9.8	17.27	30.0	-12.7	
1732.50	10.12	H	1.9	9.8	18.03	30.0	-12.0	
High Ch								
1754.30	9.90	V	1.9	9.8	17.79	30.0	-12.2	
1754.30	10.87	H	1.9	9.8	18.76	30.0	-11.2	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

11.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238

LIMIT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

RESULTS

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

11.2.1. SPURIOUS RADIATION PLOTS

GSM

Band
GSM850
GPRS

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 02-27-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: GPRS 850 MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1.648	-9.1	V	3.0	40.2	1.0	-48.3	-13.0	-35.3	
2.473	-2.2	V	3.0	40.1	1.0	-41.2	-13.0	-28.2	
3.297	-22.4	V	3.0	39.6	1.0	-61.0	-13.0	-48.0	
1.648	3.0	H	3.0	40.2	1.0	-36.2	-13.0	-23.2	
2.473	-5.2	H	3.0	40.1	1.0	-44.2	-13.0	-31.2	
3.297	-20.1	H	3.0	39.6	1.0	-58.7	-13.0	-45.7	
Mid Ch, 836.6MHz									
1.673	-7.7	V	3.0	40.2	1.0	-46.8	-13.0	-33.8	
2.510	0.2	V	3.0	40.1	1.0	-38.9	-13.0	-25.9	
3.346	-22.1	V	3.0	39.6	1.0	-60.6	-13.0	-47.6	
1.673	3.9	H	3.0	40.2	1.0	-35.3	-13.0	-22.3	
2.510	-2.6	H	3.0	40.1	1.0	-41.7	-13.0	-28.7	
3.346	-18.9	H	3.0	39.6	1.0	-57.4	-13.0	-44.4	
High Ch, 848.8MHz									
1.698	-9.7	V	3.0	40.2	1.0	-48.9	-13.0	-35.9	
2.547	-6.8	V	3.0	40.1	1.0	-45.9	-13.0	-32.9	
3.395	-21.0	V	3.0	39.5	1.0	-59.5	-13.0	-46.5	
1.698	-1.5	H	3.0	40.2	1.0	-40.7	-13.0	-27.7	
2.547	-6.4	H	3.0	40.1	1.0	-45.5	-13.0	-32.5	
3.395	-18.4	H	3.0	39.5	1.0	-56.9	-13.0	-43.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

GSM

Band
GSM850
EGPRS

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 02-27-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: EGPRS 850 MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1.648	-17.2	V	3.0	40.2	1.0	-56.3	-13.0	-43.3	
2.473	-10.1	V	3.0	40.1	1.0	-49.2	-13.0	-36.2	
3.297	-24.3	V	3.0	39.6	1.0	-62.9	-13.0	-49.9	
1.648	-5.1	H	3.0	40.2	1.0	-44.3	-13.0	-31.3	
2.473	-13.2	H	3.0	40.1	1.0	-52.3	-13.0	-39.3	
3.297	-24.6	H	3.0	39.6	1.0	-63.2	-13.0	-50.2	
Mid Ch, 836.6MHz									
1.673	-15.7	V	3.0	40.2	1.0	-54.9	-13.0	-41.9	
2.510	-7.8	V	3.0	40.1	1.0	-46.9	-13.0	-33.9	
3.346	-23.6	V	3.0	39.6	1.0	-62.2	-13.0	-49.2	
1.673	-4.1	H	3.0	40.2	1.0	-43.3	-13.0	-30.3	
2.510	-10.6	H	3.0	40.1	1.0	-49.7	-13.0	-36.7	
3.346	-23.7	H	3.0	39.6	1.0	-62.2	-13.0	-49.2	
High Ch, 848.8MHz									
1.698	-17.7	V	3.0	40.2	1.0	-56.9	-13.0	-43.9	
2.547	-14.9	V	3.0	40.1	1.0	-53.9	-13.0	-40.9	
3.395	-22.8	V	3.0	39.5	1.0	-61.3	-13.0	-48.3	
1.698	-9.6	H	3.0	40.2	1.0	-48.8	-13.0	-35.8	
2.547	-14.4	H	3.0	40.1	1.0	-53.4	-13.0	-40.4	
3.395	-23.8	H	3.0	39.5	1.0	-62.3	-13.0	-49.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

GSM

Band
GSM1900
GPRS

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: EGPRS 1900 MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3.700	4.1	V	3.0	39.2	1.0	-34.0	-13.0	-21.0	
5.551	-3.9	V	3.0	40.0	1.0	-42.9	-13.0	-29.9	
7.401	-12.6	V	3.0	39.2	1.0	-50.8	-13.0	-37.8	
3.700	4.7	H	3.0	39.2	1.0	-33.4	-13.0	-20.4	
5.550	-12.3	H	3.0	40.0	1.0	-51.2	-13.0	-38.2	
7.400	-12.1	H	3.0	39.2	1.0	-50.3	-13.0	-37.3	
Mid Ch, 1880.0MHz									
3.760	0.6	V	3.0	39.1	1.0	-37.5	-13.0	-24.5	
5.640	-10.4	V	3.0	39.9	1.0	-49.4	-13.0	-36.4	
7.520	-12.6	V	3.0	39.1	1.0	-50.8	-13.0	-37.8	
3.760	-0.5	H	3.0	39.1	1.0	-38.6	-13.0	-25.6	
5.640	-10.5	H	3.0	39.9	1.0	-49.4	-13.0	-36.4	
7.520	-12.1	H	3.0	39.1	1.0	-50.2	-13.0	-37.2	
High Ch, 1909.8 MHz									
3.820	-6.2	V	3.0	39.0	1.0	-44.2	-13.0	-31.2	
5.729	-13.8	V	3.0	39.9	1.0	-52.7	-13.0	-39.7	
7.639	-12.2	V	3.0	39.1	1.0	-50.3	-13.0	-37.3	
3.820	4.2	H	3.0	39.0	1.0	-33.8	-13.0	-20.8	
5.729	-10.1	H	3.0	39.9	1.0	-49.0	-13.0	-36.0	
7.639	-12.0	H	3.0	39.1	1.0	-50.1	-13.0	-37.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

GSM

Band
GSM1900
EGPRS

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: GPRS 1900

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3.7004	11.2	V	3.0	39.2	1.0	-26.9	-13.0	-13.9	
5.5506	-6.1	V	3.0	40.0	1.0	-45.1	-13.0	-32.1	
7.4008	-9.7	V	3.0	39.2	1.0	-47.9	-13.0	-34.9	
3.7000	17.3	H	3.0	39.2	1.0	-20.8	-13.0	-7.8	
5.5506	-3.2	H	3.0	40.0	1.0	-42.1	-13.0	-29.1	
7.4008	-11.3	H	3.0	39.2	1.0	-49.5	-13.0	-36.5	
Mid Ch, 1880.0MHz									
3.7600	9.8	V	3.0	39.1	1.0	-28.3	-13.0	-15.3	
5.6400	-2.4	V	3.0	39.9	1.0	-41.4	-13.0	-28.4	
7.5200	-6.0	V	3.0	39.1	1.0	-44.2	-13.0	-31.2	
3.7600	14.6	H	3.0	39.1	1.0	-23.5	-13.0	-10.5	
5.6400	2.2	H	3.0	39.9	1.0	-36.7	-13.0	-23.7	
7.5200	-9.9	H	3.0	39.1	1.0	-48.0	-13.0	-35.0	
High Ch, 1909.8 MHz									
3.8196	8.4	V	3.0	39.0	1.0	-29.7	-13.0	-16.7	
5.7294	0.5	V	3.0	39.9	1.0	-38.4	-13.0	-25.4	
7.6392	-11.5	V	3.0	39.1	1.0	-49.6	-13.0	-36.6	
3.8196	14.4	H	3.0	39.0	1.0	-23.6	-13.0	-10.6	
5.7294	-2.6	H	3.0	39.9	1.0	-41.5	-13.0	-28.5	
7.6392	-4.1	H	3.0	39.1	1.0	-42.2	-13.0	-29.2	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA

Band 5
REL99

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 02-27-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone / X Position
Mode: Tx, REL99,850MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.40MHz									
1.652	-21.5	V	3.0	40.2	1.0	-60.7	-13.0	-47.7	
2.479	-20.2	V	3.0	40.1	1.0	-59.2	-13.0	-46.2	
3.306	-23.0	V	3.0	39.6	1.0	-61.6	-13.0	-48.6	
1.652	-18.7	H	3.0	40.2	1.0	-57.9	-13.0	-44.9	
2.479	-20.8	H	3.0	40.1	1.0	-59.8	-13.0	-46.8	
3.306	-23.0	H	3.0	39.6	1.0	-61.6	-13.0	-48.6	
Mid Ch, 836.6MHz									
1.673	-21.5	V	3.0	40.2	1.0	-60.7	-13.0	-47.7	
2.510	-19.5	V	3.0	40.1	1.0	-58.6	-13.0	-45.6	
3.346	-22.3	V	3.0	39.6	1.0	-60.8	-13.0	-47.8	
1.673	-19.5	H	3.0	40.2	1.0	-58.7	-13.0	-45.7	
2.510	-20.3	H	3.0	40.1	1.0	-59.4	-13.0	-46.4	
3.346	-22.4	H	3.0	39.6	1.0	-60.9	-13.0	-47.9	
High Ch, 846.6MHz									
1.693	-22.2	V	3.0	40.2	1.0	-61.3	-13.0	-48.3	
2.539	-20.6	V	3.0	40.1	1.0	-59.7	-13.0	-46.7	
3.386	-21.0	V	3.0	39.5	1.0	-59.5	-13.0	-46.5	
1.693	-18.8	H	3.0	40.2	1.0	-58.0	-13.0	-45.0	
2.539	-21.5	H	3.0	40.1	1.0	-60.5	-13.0	-47.5	
3.386	-21.0	H	3.0	39.5	1.0	-59.5	-13.0	-46.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA

Band 5
HSDPA

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 02-28-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone / X Position
Mode: Tx, HSDPA,850MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.40MHz									
1.652	-21.8	V	3.0	40.2	1.0	-61.0	-13.0	-48.0	
2.479	-20.2	V	3.0	40.1	1.0	-59.2	-13.0	-46.2	
3.306	-23.0	V	3.0	39.6	1.0	-61.6	-13.0	-48.6	
1.652	-19.1	H	3.0	40.2	1.0	-58.3	-13.0	-45.3	
2.479	-20.8	H	3.0	40.1	1.0	-59.8	-13.0	-46.8	
3.306	-23.0	H	3.0	39.6	1.0	-61.6	-13.0	-48.6	
Mid Ch, 836.6MHz									
1.673	-21.7	V	3.0	40.2	1.0	-60.9	-13.0	-47.9	
2.510	-19.5	V	3.0	40.1	1.0	-58.6	-13.0	-45.6	
3.346	-22.3	V	3.0	39.6	1.0	-60.8	-13.0	-47.8	
1.673	-20.2	H	3.0	40.2	1.0	-59.4	-13.0	-46.4	
2.510	-20.3	H	3.0	40.1	1.0	-59.4	-13.0	-46.4	
3.346	-22.4	H	3.0	39.6	1.0	-60.9	-13.0	-47.9	
High Ch, 846.6MHz									
1.693	-22.3	V	3.0	40.2	1.0	-61.5	-13.0	-48.5	
2.539	-20.6	V	3.0	40.1	1.0	-59.7	-13.0	-46.7	
3.386	-21.0	V	3.0	39.5	1.0	-59.5	-13.0	-46.5	
1.693	-19.9	H	3.0	40.2	1.0	-59.1	-13.0	-46.1	
2.539	-21.5	H	3.0	40.1	1.0	-60.5	-13.0	-47.5	
3.386	-21.0	H	3.0	39.5	1.0	-59.5	-13.0	-46.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA

Band 2
REL99

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-02-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone / X Position
Mode: Tx, REL99,1900MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.705	-3.8	V	3.0	39.2	1.0	-41.9	-13.0	-28.9	
5.557	-12.6	V	3.0	40.0	1.0	-51.6	-13.0	-38.6	
7.409	-10.2	V	3.0	39.2	1.0	-48.4	-13.0	-35.4	
3.705	0.5	H	3.0	39.2	1.0	-37.7	-13.0	-24.7	
5.557	-12.5	H	3.0	40.0	1.0	-51.5	-13.0	-38.5	
7.409	-10.7	H	3.0	39.2	1.0	-48.8	-13.0	-35.8	
Mid Ch, 1880MHz									
3.760	-7.0	V	3.0	39.1	1.0	-45.1	-13.0	-32.1	
5.640	-12.2	V	3.0	39.9	1.0	-51.1	-13.0	-38.1	
7.520	-9.4	V	3.0	39.1	1.0	-47.6	-13.0	-34.6	
3.760	-3.8	H	3.0	39.1	1.0	-41.9	-13.0	-28.9	
5.640	-12.5	H	3.0	39.9	1.0	-51.4	-13.0	-38.4	
7.520	-10.6	H	3.0	39.1	1.0	-48.7	-13.0	-35.7	
High Ch, 1907.6MHz									
3.815	-7.6	V	3.0	39.0	1.0	-45.7	-13.0	-32.7	
5.723	-8.2	V	3.0	39.9	1.0	-47.0	-13.0	-34.0	
7.630	-8.9	V	3.0	39.1	1.0	-47.0	-13.0	-34.0	
3.815	-4.5	H	3.0	39.0	1.0	-42.6	-13.0	-29.6	
5.723	-8.3	H	3.0	39.9	1.0	-47.2	-13.0	-34.2	
7.630	-9.9	H	3.0	39.1	1.0	-48.0	-13.0	-35.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA

Band 2
HSDPA

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-02-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone / X Position
Mode: Tx, HSDPA, 1900MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.705	-14.4	V	3.0	39.2	1.0	-52.6	-13.0	-39.6	
5.557	-12.9	V	3.0	40.0	1.0	-51.9	-13.0	-38.9	
7.409	-10.5	V	3.0	39.2	1.0	-48.7	-13.0	-35.7	
3.705	-4.7	H	3.0	39.2	1.0	-42.9	-13.0	-29.9	
5.557	-13.2	H	3.0	40.0	1.0	-52.2	-13.0	-39.2	
7.409	-10.7	H	3.0	39.2	1.0	-48.8	-13.0	-35.8	
Mid Ch, 1880MHz									
3.760	-11.5	V	3.0	39.1	1.0	-49.6	-13.0	-36.6	
5.640	-12.5	V	3.0	39.9	1.0	-51.4	-13.0	-38.4	
7.520	-10.5	V	3.0	39.1	1.0	-48.7	-13.0	-35.7	
3.760	-8.3	H	3.0	39.1	1.0	-46.4	-13.0	-33.4	
5.640	-12.5	H	3.0	39.9	1.0	-51.4	-13.0	-38.4	
7.520	-10.6	H	3.0	39.1	1.0	-48.7	-13.0	-35.7	
High Ch, 1907.6MHz									
3.815	-11.6	V	3.0	39.0	1.0	-49.7	-13.0	-36.7	
5.723	-12.7	V	3.0	39.9	1.0	-51.6	-13.0	-38.6	
7.630	-10.1	V	3.0	39.1	1.0	-48.2	-13.0	-35.2	
3.815	-8.3	H	3.0	39.0	1.0	-46.4	-13.0	-33.4	
5.723	-12.9	H	3.0	39.9	1.0	-51.8	-13.0	-38.8	
7.630	-9.9	H	3.0	39.1	1.0	-48.0	-13.0	-35.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA

Band 4
REL99

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 02-27-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone / Z Position
Mode: Tx, REL99,1700MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1712.4MHz									
3.425	-17.7	V	3.0	39.5	1.0	-56.2	-13.0	-43.2	
5.137	-9.5	V	3.0	40.1	1.0	-48.5	-13.0	-35.5	
6.850	-8.7	V	3.0	39.4	1.0	-47.1	-13.0	-34.1	
3.425	-16.0	H	3.0	39.5	1.0	-54.4	-13.0	-41.4	
5.137	-8.2	H	3.0	40.1	1.0	-47.3	-13.0	-34.3	
6.850	-1.1	H	3.0	39.4	1.0	-39.5	-13.0	-26.5	
Mid Ch, 1732.6MHz									
3.465	-17.9	V	3.0	39.4	1.0	-56.3	-13.0	-43.3	
5.198	-10.0	V	3.0	40.1	1.0	-49.1	-13.0	-36.1	
6.930	-8.8	V	3.0	39.4	1.0	-47.2	-13.0	-34.2	
3.465	-15.1	H	3.0	39.4	1.0	-53.5	-13.0	-40.5	
5.198	-10.1	H	3.0	40.1	1.0	-49.3	-13.0	-36.3	
6.930	-1.9	H	3.0	39.4	1.0	-40.3	-13.0	-27.3	
High Ch, 1752.6MHz									
3.505	-17.3	V	3.0	39.4	1.0	-55.7	-13.0	-42.7	
5.258	-10.5	V	3.0	40.1	1.0	-49.6	-13.0	-36.6	
7.010	-8.2	V	3.0	39.3	1.0	-46.6	-13.0	-33.6	
3.505	-15.4	H	3.0	39.4	1.0	-53.8	-13.0	-40.8	
5.258	-7.9	H	3.0	40.1	1.0	-47.0	-13.0	-34.0	
7.010	-1.6	H	3.0	39.3	1.0	-40.0	-13.0	-27.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

WCDMA

Band 4
HSDPA

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 02-28-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone / Z Position
Mode: Tx, HSDPA, 1700MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1712.4MHz									
3.425	-18.7	V	3.0	39.5	1.0	-57.1	-13.0	-44.1	
5.137	-10.2	V	3.0	40.1	1.0	-49.3	-13.0	-36.3	
6.850	-10.3	V	3.0	39.4	1.0	-48.7	-13.0	-35.7	
3.425	-16.5	H	3.0	39.5	1.0	-55.0	-13.0	-42.0	
5.137	-9.9	H	3.0	40.1	1.0	-48.9	-13.0	-35.9	
6.850	-2.1	H	3.0	39.4	1.0	-40.5	-13.0	-27.5	
Mid Ch, 1732.6MHz									
3.465	-18.9	V	3.0	39.4	1.0	-57.3	-13.0	-44.3	
5.198	-11.2	V	3.0	40.1	1.0	-50.3	-13.0	-37.3	
6.930	-9.6	V	3.0	39.4	1.0	-47.9	-13.0	-34.9	
3.465	-16.3	H	3.0	39.4	1.0	-54.8	-13.0	-41.8	
5.198	-11.8	H	3.0	40.1	1.0	-50.9	-13.0	-37.9	
6.930	-3.7	H	3.0	39.4	1.0	-42.1	-13.0	-29.1	
High Ch, 1752.6MHz									
3.505	-18.6	V	3.0	39.4	1.0	-57.0	-13.0	-44.0	
5.258	-10.9	V	3.0	40.1	1.0	-50.0	-13.0	-37.0	
7.010	-9.9	V	3.0	39.3	1.0	-48.2	-13.0	-35.2	
3.505	-17.1	H	3.0	39.4	1.0	-55.4	-13.0	-42.4	
5.258	-9.9	H	3.0	40.1	1.0	-49.0	-13.0	-36.0	
7.010	-3.0	H	3.0	39.3	1.0	-41.3	-13.0	-28.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2
20MHz
QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-01-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / X-Position
Mode: TX, LTE BAND 2, 20MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1860MHz)									
3.720	-6.0	V	3.0	39.1	1.0	-44.1	-13.0	-31.1	
5.580	-7.6	V	3.0	40.0	1.0	-46.6	-13.0	-33.6	
7.440	-6.1	V	3.0	39.2	1.0	-44.3	-13.0	-31.3	
3.720	-3.0	H	3.0	39.1	1.0	-41.1	-13.0	-28.1	
5.580	-7.7	H	3.0	40.0	1.0	-46.7	-13.0	-33.7	
7.440	-5.8	H	3.0	39.2	1.0	-43.9	-13.0	-30.9	
Mid Channel (1880MHz)									
3.760	-8.8	V	3.0	39.1	1.0	-46.9	-13.0	-33.9	
5.640	-8.9	V	3.0	39.9	1.0	-47.9	-13.0	-34.9	
7.520	-5.6	V	3.0	39.1	1.0	-43.7	-13.0	-30.7	
3.760	-6.4	H	3.0	39.1	1.0	-44.5	-13.0	-31.5	
5.640	-9.0	H	3.0	39.9	1.0	-47.9	-13.0	-34.9	
7.520	-5.2	H	3.0	39.1	1.0	-43.4	-13.0	-30.4	
High Channel (1900MHz)									
3.800	-10.7	V	3.0	39.1	1.0	-48.7	-13.0	-35.7	
5.700	-6.7	V	3.0	39.9	1.0	-45.6	-13.0	-32.6	
7.600	-3.6	V	3.0	39.1	1.0	-41.7	-13.0	-28.7	
3.800	-5.4	H	3.0	39.1	1.0	-43.5	-13.0	-30.5	
5.700	-7.1	H	3.0	39.9	1.0	-46.0	-13.0	-33.0	
7.600	-3.2	H	3.0	39.1	1.0	-41.4	-13.0	-28.4	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2
20MHz
16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-01-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / X-Position
Mode: TX, LTE BAND 2, 20MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1860MHz)									
3.720	-7.0	V	3.0	39.1	1.0	-45.1	-13.0	-32.1	
5.580	-7.6	V	3.0	40.0	1.0	-46.6	-13.0	-33.6	
7.440	-6.1	V	3.0	39.2	1.0	-44.3	-13.0	-31.3	
3.720	-4.0	H	3.0	39.1	1.0	-42.1	-13.0	-29.1	
5.580	-7.7	H	3.0	40.0	1.0	-46.7	-13.0	-33.7	
7.440	-5.8	H	3.0	39.2	1.0	-43.9	-13.0	-30.9	
Mid Channel (1880MHz)									
3.760	-10.1	V	3.0	39.1	1.0	-48.2	-13.0	-35.2	
5.640	-8.9	V	3.0	39.9	1.0	-47.9	-13.0	-34.9	
7.520	-5.6	V	3.0	39.1	1.0	-43.7	-13.0	-30.7	
3.760	-7.2	H	3.0	39.1	1.0	-45.3	-13.0	-32.3	
5.640	-9.0	H	3.0	39.9	1.0	-47.9	-13.0	-34.9	
7.520	-5.2	H	3.0	39.1	1.0	-43.4	-13.0	-30.4	
High Channel (1900MHz)									
3.800	-12.0	V	3.0	39.1	1.0	-50.0	-13.0	-37.0	
5.700	-6.7	V	3.0	39.9	1.0	-45.6	-13.0	-32.6	
7.600	-3.6	V	3.0	39.1	1.0	-41.7	-13.0	-28.7	
3.800	-6.7	H	3.0	39.1	1.0	-44.7	-13.0	-31.7	
5.700	-7.1	H	3.0	39.9	1.0	-46.0	-13.0	-33.0	
7.600	-3.2	H	3.0	39.1	1.0	-41.4	-13.0	-28.4	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2
15MHz
QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-01-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / X-Position
Mode: TX, LTE BAND 2, 15MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1857.5MHz)									
3.715	-3.9	V	3.0	39.1	1.0	-42.1	-13.0	-29.1	
5.573	-8.7	V	3.0	40.0	1.0	-47.7	-13.0	-34.7	
7.430	-7.3	V	3.0	39.2	1.0	-45.5	-13.0	-32.5	
3.715	-1.1	H	3.0	39.1	1.0	-39.2	-13.0	-26.2	
5.573	-8.8	H	3.0	40.0	1.0	-47.8	-13.0	-34.8	
7.430	-7.0	H	3.0	39.2	1.0	-45.2	-13.0	-32.2	
Mid Channel (1880MHz)									
3.760	-9.5	V	3.0	39.1	1.0	-47.6	-13.0	-34.6	
5.640	-10.1	V	3.0	39.9	1.0	-49.0	-13.0	-36.0	
7.520	-6.8	V	3.0	39.1	1.0	-44.9	-13.0	-31.9	
3.760	-6.4	H	3.0	39.1	1.0	-44.5	-13.0	-31.5	
5.640	-10.2	H	3.0	39.9	1.0	-49.1	-13.0	-36.1	
7.520	-6.5	H	3.0	39.1	1.0	-44.6	-13.0	-31.6	
High Channel (1902.5MHz)									
3.805	-11.8	V	3.0	39.0	1.0	-49.8	-13.0	-36.8	
5.708	-7.9	V	3.0	39.9	1.0	-46.8	-13.0	-33.8	
7.610	-4.9	V	3.0	39.1	1.0	-43.0	-13.0	-30.0	
3.805	-6.3	H	3.0	39.0	1.0	-44.3	-13.0	-31.3	
5.708	-8.5	H	3.0	39.9	1.0	-47.4	-13.0	-34.4	
7.610	-4.5	H	3.0	39.1	1.0	-42.7	-13.0	-29.7	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2
15MHz
16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-01-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / X-Position
Mode: TX, LTE BAND 2, 15MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1857.5MHz)									
3.715	-4.9	V	3.0	39.1	1.0	-43.1	-13.0	-30.1	
5.573	-9.6	V	3.0	40.0	1.0	-48.6	-13.0	-35.6	
7.430	-7.3	V	3.0	39.2	1.0	-45.5	-13.0	-32.5	
3.715	-2.0	H	3.0	39.1	1.0	-40.2	-13.0	-27.2	
5.573	-9.9	H	3.0	40.0	1.0	-48.9	-13.0	-35.9	
7.430	-7.0	H	3.0	39.2	1.0	-45.2	-13.0	-32.2	
Mid Channel (1880MHz)									
3.760	-10.5	V	3.0	39.1	1.0	-48.6	-13.0	-35.6	
5.640	-10.7	V	3.0	39.9	1.0	-49.7	-13.0	-36.7	
7.520	-6.8	V	3.0	39.1	1.0	-44.9	-13.0	-31.9	
3.760	-7.5	H	3.0	39.1	1.0	-45.6	-13.0	-32.6	
5.640	-10.5	H	3.0	39.9	1.0	-49.4	-13.0	-36.4	
7.520	-6.5	H	3.0	39.1	1.0	-44.6	-13.0	-31.6	
High Channel (1902.5MHz)									
3.805	-12.9	V	3.0	39.0	1.0	-50.9	-13.0	-37.9	
5.708	-8.2	V	3.0	39.9	1.0	-47.1	-13.0	-34.1	
7.610	-4.9	V	3.0	39.1	1.0	-43.0	-13.0	-30.0	
3.805	-7.6	H	3.0	39.0	1.0	-45.6	-13.0	-32.6	
5.708	-9.6	H	3.0	39.9	1.0	-48.5	-13.0	-35.5	
7.610	-4.5	H	3.0	39.1	1.0	-42.7	-13.0	-29.7	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2
10MHz
QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-01-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / X-Position
Mode: TX, LTE BAND 2, 10MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1855MHz)									
3.710	-5.9	V	3.0	39.2	1.0	-44.0	-13.0	-31.0	
5.565	-10.6	V	3.0	40.0	1.0	-49.6	-13.0	-36.6	
7.445	-9.0	V	3.0	39.2	1.0	-47.2	-13.0	-34.2	
3.710	-1.2	H	3.0	39.2	1.0	-39.4	-13.0	-26.4	
5.565	-10.7	H	3.0	40.0	1.0	-49.7	-13.0	-36.7	
7.445	-8.6	H	3.0	39.2	1.0	-46.8	-13.0	-33.8	
Mid Channel (1880MHz)									
3.760	-10.2	V	3.0	39.1	1.0	-48.3	-13.0	-35.3	
5.640	-11.2	V	3.0	39.9	1.0	-50.2	-13.0	-37.2	
7.520	-8.5	V	3.0	39.1	1.0	-46.7	-13.0	-33.7	
3.760	-7.0	H	3.0	39.1	1.0	-45.1	-13.0	-32.1	
5.640	-11.8	H	3.0	39.9	1.0	-50.7	-13.0	-37.7	
7.520	-8.2	H	3.0	39.1	1.0	-46.3	-13.0	-33.3	
High Channel (1905MHz)									
3.810	-9.5	V	3.0	39.0	1.0	-47.5	-13.0	-34.5	
5.715	-9.7	V	3.0	39.9	1.0	-48.6	-13.0	-35.6	
7.620	-7.0	V	3.0	39.1	1.0	-45.2	-13.0	-32.2	
3.810	-6.0	H	3.0	39.0	1.0	-44.1	-13.0	-31.1	
5.715	-10.4	H	3.0	39.9	1.0	-49.3	-13.0	-36.3	
7.620	-6.8	H	3.0	39.1	1.0	-44.9	-13.0	-31.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2
10MHz
16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-01-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / X-Position
Mode: TX, LTE BAND 2, 10MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1855MHz)									
3.710	-7.2	V	3.0	39.2	1.0	-45.4	-13.0	-32.4	
5.565	-10.6	V	3.0	40.0	1.0	-49.6	-13.0	-36.6	
7.445	-9.0	V	3.0	39.2	1.0	-47.2	-13.0	-34.2	
3.710	-2.5	H	3.0	39.2	1.0	-40.7	-13.0	-27.7	
5.565	-10.7	H	3.0	40.0	1.0	-49.7	-13.0	-36.7	
7.445	-8.6	H	3.0	39.2	1.0	-46.8	-13.0	-33.8	
Mid Channel (1880MHz)									
3.760	-11.2	V	3.0	39.1	1.0	-49.3	-13.0	-36.3	
5.640	-11.2	V	3.0	39.9	1.0	-50.2	-13.0	-37.2	
7.520	-8.5	V	3.0	39.1	1.0	-46.7	-13.0	-33.7	
3.760	-8.5	H	3.0	39.1	1.0	-46.6	-13.0	-33.6	
5.640	-11.8	H	3.0	39.9	1.0	-50.7	-13.0	-37.7	
7.520	-8.2	H	3.0	39.1	1.0	-46.3	-13.0	-33.3	
High Channel (1905MHz)									
3.810	-10.6	V	3.0	39.0	1.0	-48.7	-13.0	-35.7	
5.715	-9.7	V	3.0	39.9	1.0	-48.6	-13.0	-35.6	
7.620	-7.0	V	3.0	39.1	1.0	-45.2	-13.0	-32.2	
3.810	-7.1	H	3.0	39.0	1.0	-45.2	-13.0	-32.2	
5.715	-10.4	H	3.0	39.9	1.0	-49.3	-13.0	-36.3	
7.620	-6.8	H	3.0	39.1	1.0	-44.9	-13.0	-31.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2
5MHz
QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-01-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / X-Position
Mode: TX, LTE BAND 2, 5MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1852.5MHz)									
3.705	-5.1	V	3.0	39.2	1.0	-43.3	-13.0	-30.3	
5.558	-9.4	V	3.0	40.0	1.0	-48.4	-13.0	-35.4	
7.410	-8.0	V	3.0	39.2	1.0	-46.2	-13.0	-33.2	
3.705	-1.3	H	3.0	39.2	1.0	-39.4	-13.0	-26.4	
5.558	-9.7	H	3.0	40.0	1.0	-48.6	-13.0	-35.6	
7.410	-7.8	H	3.0	39.2	1.0	-45.9	-13.0	-32.9	
Mid Channel (1880MHz)									
3.760	-6.8	V	3.0	39.1	1.0	-44.9	-13.0	-31.9	
5.640	-10.5	V	3.0	39.9	1.0	-49.4	-13.0	-36.4	
7.520	-7.9	V	3.0	39.1	1.0	-46.1	-13.0	-33.1	
3.760	-1.9	H	3.0	39.1	1.0	-40.0	-13.0	-27.0	
5.640	-10.8	H	3.0	39.9	1.0	-49.7	-13.0	-36.7	
7.520	-7.6	H	3.0	39.1	1.0	-45.7	-13.0	-32.7	
High Channel (1907.5MHz)									
3.815	-8.2	V	3.0	39.0	1.0	-46.2	-13.0	-33.2	
5.723	-8.7	V	3.0	39.9	1.0	-47.6	-13.0	-34.6	
7.630	-7.2	V	3.0	39.1	1.0	-45.3	-13.0	-32.3	
3.815	-2.4	H	3.0	39.0	1.0	-40.4	-13.0	-27.4	
5.723	-9.9	H	3.0	39.9	1.0	-48.8	-13.0	-35.8	
7.630	-7.4	H	3.0	39.1	1.0	-45.5	-13.0	-32.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2
5MHz
16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-01-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / X-Position
Mode: TX, LTE BAND 2, 5MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1852.5MHz)									
3.705	-6.0	V	3.0	39.2	1.0	-44.2	-13.0	-31.2	
5.558	-10.1	V	3.0	40.0	1.0	-49.1	-13.0	-36.1	
7.410	-8.0	V	3.0	39.2	1.0	-46.2	-13.0	-33.2	
3.705	-2.3	H	3.0	39.2	1.0	-40.5	-13.0	-27.5	
5.558	-11.0	H	3.0	40.0	1.0	-50.0	-13.0	-37.0	
7.410	-7.8	H	3.0	39.2	1.0	-45.9	-13.0	-32.9	
Mid Channel (1880MHz)									
3.760	-7.7	V	3.0	39.1	1.0	-45.8	-13.0	-32.8	
5.640	-10.5	V	3.0	39.9	1.0	-49.4	-13.0	-36.4	
7.520	-7.9	V	3.0	39.1	1.0	-46.1	-13.0	-33.1	
3.760	-2.9	H	3.0	39.1	1.0	-41.0	-13.0	-28.0	
5.640	-10.8	H	3.0	39.9	1.0	-49.7	-13.0	-36.7	
7.520	-7.6	H	3.0	39.1	1.0	-45.7	-13.0	-32.7	
High Channel (1907.5MHz)									
3.815	-9.2	V	3.0	39.0	1.0	-47.2	-13.0	-34.2	
5.723	-9.2	V	3.0	39.9	1.0	-48.1	-13.0	-35.1	
7.630	-7.2	V	3.0	39.1	1.0	-45.3	-13.0	-32.3	
3.815	-3.5	H	3.0	39.0	1.0	-41.5	-13.0	-28.5	
5.723	-9.9	H	3.0	39.9	1.0	-48.8	-13.0	-35.8	
7.630	-7.4	H	3.0	39.1	1.0	-45.5	-13.0	-32.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2
3MHz
QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-01-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / X-Position
Mode: TX, LTE BAND 2, 3MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1851.5MHz)									
3.703	-5.2	V	3.0	39.2	1.0	-43.3	-13.0	-30.3	
5.555	-15.5	V	3.0	40.0	1.0	-54.5	-13.0	-41.5	
7.406	-13.2	V	3.0	39.2	1.0	-51.4	-13.0	-38.4	
3.703	-1.2	H	3.0	39.2	1.0	-39.4	-13.0	-26.4	
5.555	-15.6	H	3.0	40.0	1.0	-54.5	-13.0	-41.5	
7.406	-12.9	H	3.0	39.2	1.0	-51.1	-13.0	-38.1	
Mid Channel (1880MHz)									
3.760	-8.9	V	3.0	39.1	1.0	-47.0	-13.0	-34.0	
5.640	-14.9	V	3.0	39.9	1.0	-53.8	-13.0	-40.8	
7.520	-13.1	V	3.0	39.1	1.0	-51.3	-13.0	-38.3	
3.760	-5.5	H	3.0	39.1	1.0	-43.6	-13.0	-30.6	
5.640	-16.6	H	3.0	39.9	1.0	-55.5	-13.0	-42.5	
7.520	-12.6	H	3.0	39.1	1.0	-50.8	-13.0	-37.8	
High Channel (1908.5MHz)									
3.817	-10.3	V	3.0	39.0	1.0	-48.4	-13.0	-35.4	
5.726	-15.2	V	3.0	39.9	1.0	-54.1	-13.0	-41.1	
7.634	-12.9	V	3.0	39.1	1.0	-51.0	-13.0	-38.0	
3.817	-5.3	H	3.0	39.0	1.0	-43.3	-13.0	-30.3	
5.726	-13.9	H	3.0	39.9	1.0	-52.7	-13.0	-39.7	
7.634	-12.5	H	3.0	39.1	1.0	-50.6	-13.0	-37.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2
3MHz
16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-01-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / X-Position
Mode: TX, LTE BAND 2, 3MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1851.5MHz)									
3.703	-6.1	V	3.0	39.2	1.0	-44.2	-13.0	-31.2	
5.555	-15.4	V	3.0	40.0	1.0	-54.4	-13.0	-41.4	
7.406	-13.2	V	3.0	39.2	1.0	-51.4	-13.0	-38.4	
3.703	-2.3	H	3.0	39.2	1.0	-40.4	-13.0	-27.4	
5.555	-15.6	H	3.0	40.0	1.0	-54.5	-13.0	-41.5	
7.406	-12.9	H	3.0	39.2	1.0	-51.1	-13.0	-38.1	
Mid Channel (1880MHz)									
3.760	-10.0	V	3.0	39.1	1.0	-48.1	-13.0	-35.1	
5.640	-14.9	V	3.0	39.9	1.0	-53.8	-13.0	-40.8	
7.520	-13.1	V	3.0	39.1	1.0	-51.3	-13.0	-38.3	
3.760	-6.6	H	3.0	39.1	1.0	-44.7	-13.0	-31.7	
5.640	-16.6	H	3.0	39.9	1.0	-55.5	-13.0	-42.5	
7.520	-12.6	H	3.0	39.1	1.0	-50.8	-13.0	-37.8	
High Channel (1908.5MHz)									
3.817	-11.4	V	3.0	39.0	1.0	-49.4	-13.0	-36.4	
5.726	-15.2	V	3.0	39.9	1.0	-54.1	-13.0	-41.1	
7.634	-12.9	V	3.0	39.1	1.0	-51.0	-13.0	-38.0	
3.817	-6.4	H	3.0	39.0	1.0	-44.4	-13.0	-31.4	
5.726	-13.9	H	3.0	39.9	1.0	-52.7	-13.0	-39.7	
7.634	-12.5	H	3.0	39.1	1.0	-50.6	-13.0	-37.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2
1.4MHz
QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-01-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / X-Position
Mode: TX, LTE BAND 2, 1.4MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1850.7MHz)									
3.7014	-4.7	V	3.0	39.2	1.0	-42.9	-13.0	-29.9	
5.5071	-19.3	V	3.0	40.0	1.0	-58.3	-13.0	-45.3	
7.3578	-16.1	V	3.0	39.2	1.0	-54.4	-13.0	-41.4	
3.7014	-0.2	H	3.0	39.2	1.0	-38.4	-13.0	-25.4	
5.5071	-19.4	H	3.0	40.0	1.0	-58.4	-13.0	-45.4	
7.3578	-15.8	H	3.0	39.2	1.0	-54.0	-13.0	-41.0	
Mid Channel (1880MHz)									
3.7600	-8.3	V	3.0	39.1	1.0	-46.4	-13.0	-33.4	
5.6400	-15.2	V	3.0	39.9	1.0	-54.1	-13.0	-41.1	
7.5200	-16.8	V	3.0	39.1	1.0	-54.9	-13.0	-41.9	
3.7600	-8.8	H	3.0	39.1	1.0	-46.9	-13.0	-33.9	
5.6400	-19.3	H	3.0	39.9	1.0	-58.2	-13.0	-45.2	
7.5200	-15.5	H	3.0	39.1	1.0	-53.6	-13.0	-40.6	
High Channel (1909.3MHz)									
3.8186	-9.1	V	3.0	39.0	1.0	-47.2	-13.0	-34.2	
5.7279	-16.1	V	3.0	39.9	1.0	-55.0	-13.0	-42.0	
7.6732	-17.2	V	3.0	39.1	1.0	-55.3	-13.0	-42.3	
3.8186	-7.8	H	3.0	39.0	1.0	-45.8	-13.0	-32.8	
5.7279	-17.1	H	3.0	39.9	1.0	-56.0	-13.0	-43.0	
7.6732	-16.8	H	3.0	39.1	1.0	-54.9	-13.0	-41.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 2
1.4MHz
16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-01-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / X-Position
Mode: TX, LTE BAND 2, 1.4MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1850.7MHz)									
3.701	-5.7	V	3.0	39.2	1.0	-43.8	-13.0	-30.8	
5.507	-19.3	V	3.0	40.0	1.0	-58.3	-13.0	-45.3	
7.358	-16.1	V	3.0	39.2	1.0	-54.4	-13.0	-41.4	
3.701	-1.3	H	3.0	39.2	1.0	-39.4	-13.0	-26.4	
5.507	-19.4	H	3.0	40.0	1.0	-58.4	-13.0	-45.4	
7.358	-15.8	H	3.0	39.2	1.0	-54.0	-13.0	-41.0	
Mid Channel (1880MHz)									
3.760	-9.2	V	3.0	39.1	1.0	-47.3	-13.0	-34.3	
5.640	-15.4	V	3.0	39.9	1.0	-54.3	-13.0	-41.3	
7.520	-16.8	V	3.0	39.1	1.0	-54.9	-13.0	-41.9	
3.760	-9.9	H	3.0	39.1	1.0	-48.0	-13.0	-35.0	
5.640	-19.3	H	3.0	39.9	1.0	-58.2	-13.0	-45.2	
7.520	-15.5	H	3.0	39.1	1.0	-53.6	-13.0	-40.6	
High Channel (1909.3MHz)									
3.819	-10.3	V	3.0	39.0	1.0	-48.3	-13.0	-35.3	
5.728	-17.3	V	3.0	39.9	1.0	-56.2	-13.0	-43.2	
7.673	-17.2	V	3.0	39.1	1.0	-55.3	-13.0	-42.3	
3.819	-8.6	H	3.0	39.0	1.0	-46.6	-13.0	-33.6	
5.728	-18.2	H	3.0	39.9	1.0	-57.1	-13.0	-44.1	
7.673	-16.8	H	3.0	39.1	1.0	-54.9	-13.0	-41.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4
20MHz
QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 20MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1720MHz)									
3.4400	-15.9	V	3.0	39.5	1.0	-54.4	-13.0	-41.4	
5.1600	-8.8	V	3.0	40.1	1.0	-47.9	-13.0	-34.9	
6.8800	-7.2	V	3.0	39.4	1.0	-45.6	-13.0	-32.6	
3.4400	-16.0	H	3.0	39.5	1.0	-54.5	-13.0	-41.5	
5.1600	-9.0	H	3.0	40.1	1.0	-48.1	-13.0	-35.1	
6.8800	-6.8	H	3.0	39.4	1.0	-45.2	-13.0	-32.2	
Mid Channel (1732.5MHz)									
3.4650	-15.9	V	3.0	39.4	1.0	-54.3	-13.0	-41.3	
5.1975	-9.3	V	3.0	40.1	1.0	-48.4	-13.0	-35.4	
6.9300	-4.9	V	3.0	39.4	1.0	-43.2	-13.0	-30.2	
3.4650	-16.0	H	3.0	39.4	1.0	-54.5	-13.0	-41.5	
5.1975	-9.3	H	3.0	40.1	1.0	-48.4	-13.0	-35.4	
6.9300	-4.5	H	3.0	39.4	1.0	-42.9	-13.0	-29.9	
High Channel (1745MHz)									
3.4900	-15.0	V	3.0	39.4	1.0	-53.4	-13.0	-40.4	
5.2350	-7.9	V	3.0	40.1	1.0	-47.0	-13.0	-34.0	
6.9800	-6.7	V	3.0	39.3	1.0	-45.0	-13.0	-32.0	
3.4900	-15.1	H	3.0	39.4	1.0	-53.5	-13.0	-40.5	
5.2350	-8.1	H	3.0	40.1	1.0	-47.2	-13.0	-34.2	
6.9800	-6.3	H	3.0	39.3	1.0	-44.6	-13.0	-31.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4
20MHz
16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 20MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1720MHz)									
3.4400	-15.9	V	3.0	39.5	1.0	-54.4	-13.0	-41.4	
5.1600	-8.8	V	3.0	40.1	1.0	-47.9	-13.0	-34.9	
6.8800	-7.2	V	3.0	39.4	1.0	-45.6	-13.0	-32.6	
3.4400	-16.0	H	3.0	39.5	1.0	-54.5	-13.0	-41.5	
5.1600	-9.0	H	3.0	40.1	1.0	-48.1	-13.0	-35.1	
6.8800	-6.8	H	3.0	39.4	1.0	-45.2	-13.0	-32.2	
Mid Channel (1732.5MHz)									
3.4650	-15.9	V	3.0	39.4	1.0	-54.3	-13.0	-41.3	
5.1975	-9.3	V	3.0	40.1	1.0	-48.4	-13.0	-35.4	
6.9300	-4.9	V	3.0	39.4	1.0	-43.2	-13.0	-30.2	
3.4650	-16.0	H	3.0	39.4	1.0	-54.5	-13.0	-41.5	
5.1975	-9.3	H	3.0	40.1	1.0	-48.4	-13.0	-35.4	
6.9300	-4.5	H	3.0	39.4	1.0	-42.9	-13.0	-29.9	
High Channel (1745MHz)									
3.4900	-15.0	V	3.0	39.4	1.0	-53.4	-13.0	-40.4	
5.2350	-7.9	V	3.0	40.1	1.0	-47.0	-13.0	-34.0	
6.9800	-6.7	V	3.0	39.3	1.0	-45.0	-13.0	-32.0	
3.4900	-15.1	H	3.0	39.4	1.0	-53.5	-13.0	-40.5	
5.2350	-8.1	H	3.0	40.1	1.0	-47.2	-13.0	-34.2	
6.9800	-6.3	H	3.0	39.3	1.0	-44.6	-13.0	-31.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4
15MHz
QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 15MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1717.5MHz)									
3.4350	-18.8	V	3.0	39.5	1.0	-57.3	-13.0	-44.3	
5.1525	-11.4	V	3.0	40.1	1.0	-50.4	-13.0	-37.4	
6.8700	-10.2	V	3.0	39.4	1.0	-48.6	-13.0	-35.6	
3.4350	-18.9	H	3.0	39.5	1.0	-57.3	-13.0	-44.3	
5.1525	-11.4	H	3.0	40.1	1.0	-50.5	-13.0	-37.5	
6.8700	-9.9	H	3.0	39.4	1.0	-48.3	-13.0	-35.3	
Mid Channel (1732.5MHz)									
3.4650	-18.9	V	3.0	39.4	1.0	-57.3	-13.0	-44.3	
5.1975	-12.2	V	3.0	40.1	1.0	-51.3	-13.0	-38.3	
6.9300	-7.8	V	3.0	39.4	1.0	-46.1	-13.0	-33.1	
3.4650	-19.1	H	3.0	39.4	1.0	-57.5	-13.0	-44.5	
5.1975	-12.2	H	3.0	40.1	1.0	-51.4	-13.0	-38.4	
6.9300	-7.4	H	3.0	39.4	1.0	-45.8	-13.0	-32.8	
High Channel (1747.5MHz)									
3.4950	-17.8	V	3.0	39.4	1.0	-56.2	-13.0	-43.2	
5.2425	-10.6	V	3.0	40.1	1.0	-49.7	-13.0	-36.7	
6.9900	-9.4	V	3.0	39.3	1.0	-47.8	-13.0	-34.8	
3.4950	-17.9	H	3.0	39.4	1.0	-56.3	-13.0	-43.3	
5.2425	-12.7	H	3.0	40.1	1.0	-51.8	-13.0	-38.8	
6.9900	-9.1	H	3.0	39.3	1.0	-47.4	-13.0	-34.4	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4
15MHz
16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 15MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1717.5MHz)									
3.4350	-18.8	V	3.0	39.5	1.0	-57.3	-13.0	-44.3	
5.1525	-11.4	V	3.0	40.1	1.0	-50.4	-13.0	-37.4	
6.8700	-10.2	V	3.0	39.4	1.0	-48.6	-13.0	-35.6	
3.4350	-18.9	H	3.0	39.5	1.0	-57.3	-13.0	-44.3	
5.1525	-11.4	H	3.0	40.1	1.0	-50.5	-13.0	-37.5	
6.8700	-9.9	H	3.0	39.4	1.0	-48.3	-13.0	-35.3	
Mid Channel (1732.5MHz)									
3.4650	-18.9	V	3.0	39.4	1.0	-57.3	-13.0	-44.3	
5.1975	-12.2	V	3.0	40.1	1.0	-51.3	-13.0	-38.3	
6.9300	-7.8	V	3.0	39.4	1.0	-46.1	-13.0	-33.1	
3.4650	-19.1	H	3.0	39.4	1.0	-57.5	-13.0	-44.5	
5.1975	-12.2	H	3.0	40.1	1.0	-51.4	-13.0	-38.4	
6.9300	-7.4	H	3.0	39.4	1.0	-45.8	-13.0	-32.8	
High Channel (1747.5MHz)									
3.4950	-17.8	V	3.0	39.4	1.0	-56.2	-13.0	-43.2	
5.2425	-10.6	V	3.0	40.1	1.0	-49.7	-13.0	-36.7	
6.9900	-9.4	V	3.0	39.3	1.0	-47.8	-13.0	-34.8	
3.4950	-17.9	H	3.0	39.4	1.0	-56.3	-13.0	-43.3	
5.2425	-12.7	H	3.0	40.1	1.0	-51.8	-13.0	-38.8	
6.9900	-9.1	H	3.0	39.3	1.0	-47.4	-13.0	-34.4	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4
10MHz
QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 10MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1715MHz)									
3.4300	-18.6	V	3.0	39.5	1.0	-57.0	-13.0	-44.0	
5.1450	-11.1	V	3.0	40.1	1.0	-50.1	-13.0	-37.1	
6.8600	-10.2	V	3.0	39.4	1.0	-48.6	-13.0	-35.6	
3.4300	-18.7	H	3.0	39.5	1.0	-57.2	-13.0	-44.2	
5.1450	-11.1	H	3.0	40.1	1.0	-50.1	-13.0	-37.1	
6.8600	-9.8	H	3.0	39.4	1.0	-48.2	-13.0	-35.2	
Mid Channel (1732.5MHz)									
3.4650	-19.0	V	3.0	39.4	1.0	-57.4	-13.0	-44.4	
5.1975	-12.2	V	3.0	40.1	1.0	-51.3	-13.0	-38.3	
6.9300	-7.8	V	3.0	39.4	1.0	-46.2	-13.0	-33.2	
3.4650	-19.1	H	3.0	39.4	1.0	-57.5	-13.0	-44.5	
5.1975	-12.1	H	3.0	40.1	1.0	-51.2	-13.0	-38.2	
6.9300	-7.4	H	3.0	39.4	1.0	-45.8	-13.0	-32.8	
High Channel (1750MHz)									
3.5000	-17.5	V	3.0	39.4	1.0	-55.9	-13.0	-42.9	
5.2500	-10.6	V	3.0	40.1	1.0	-49.7	-13.0	-36.7	
7.0000	-9.1	V	3.0	39.3	1.0	-47.4	-13.0	-34.4	
3.5000	-17.7	H	3.0	39.4	1.0	-56.0	-13.0	-43.0	
5.2500	-10.2	H	3.0	40.1	1.0	-49.3	-13.0	-36.3	
7.0000	-8.7	H	3.0	39.3	1.0	-47.1	-13.0	-34.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4
10MHz
16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 10MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1715MHz)									
3.4300	-18.6	V	3.0	39.5	1.0	-57.0	-13.0	-44.0	
5.1450	-11.1	V	3.0	40.1	1.0	-50.1	-13.0	-37.1	
6.8600	-10.2	V	3.0	39.4	1.0	-48.6	-13.0	-35.6	
3.4300	-18.7	H	3.0	39.5	1.0	-57.2	-13.0	-44.2	
5.1450	-11.1	H	3.0	40.1	1.0	-50.1	-13.0	-37.1	
6.8600	-9.8	H	3.0	39.4	1.0	-48.2	-13.0	-35.2	
Mid Channel (1732.5MHz)									
3.4650	-19.0	V	3.0	39.4	1.0	-57.4	-13.0	-44.4	
5.1975	-12.2	V	3.0	40.1	1.0	-51.3	-13.0	-38.3	
6.9300	-7.8	V	3.0	39.4	1.0	-46.2	-13.0	-33.2	
3.4650	-19.1	H	3.0	39.4	1.0	-57.5	-13.0	-44.5	
5.1975	-12.1	H	3.0	40.1	1.0	-51.2	-13.0	-38.2	
6.9300	-7.4	H	3.0	39.4	1.0	-45.8	-13.0	-32.8	
High Channel (1750MHz)									
3.5000	-17.5	V	3.0	39.4	1.0	-55.9	-13.0	-42.9	
5.2500	-10.6	V	3.0	40.1	1.0	-49.7	-13.0	-36.7	
7.0000	-9.1	V	3.0	39.3	1.0	-47.4	-13.0	-34.4	
3.5000	-17.7	H	3.0	39.4	1.0	-56.0	-13.0	-43.0	
5.2500	-10.2	H	3.0	40.1	1.0	-49.3	-13.0	-36.3	
7.0000	-8.7	H	3.0	39.3	1.0	-47.1	-13.0	-34.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4
5MHz
QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 5MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1712.5MHz)									
3.4250	-21.2	V	3.0	39.5	1.0	-59.7	-13.0	-46.7	
5.1375	-13.9	V	3.0	40.1	1.0	-53.0	-13.0	-40.0	
6.5800	-11.5	V	3.0	39.5	1.0	-50.1	-13.0	-37.1	
3.4250	-21.3	H	3.0	39.5	1.0	-59.8	-13.0	-46.8	
5.1375	-13.7	H	3.0	40.1	1.0	-52.8	-13.0	-39.8	
6.5800	-11.3	H	3.0	39.5	1.0	-49.8	-13.0	-36.8	
Mid Channel (1732.5MHz)									
3.4650	-21.8	V	3.0	39.4	1.0	-60.2	-13.0	-47.2	
5.1975	-14.9	V	3.0	40.1	1.0	-54.0	-13.0	-41.0	
6.9300	-10.6	V	3.0	39.4	1.0	-48.9	-13.0	-35.9	
3.4650	-21.9	H	3.0	39.4	1.0	-60.3	-13.0	-47.3	
5.1975	-15.1	H	3.0	40.1	1.0	-54.2	-13.0	-41.2	
6.9300	-10.3	H	3.0	39.4	1.0	-48.6	-13.0	-35.6	
High Channel (1752.5MHz)									
3.5050	-20.2	V	3.0	39.4	1.0	-58.6	-13.0	-45.6	
5.2575	-12.8	V	3.0	40.1	1.0	-51.9	-13.0	-38.9	
7.0100	-11.6	V	3.0	39.3	1.0	-49.9	-13.0	-36.9	
3.5050	-20.2	H	3.0	39.4	1.0	-58.6	-13.0	-45.6	
5.2575	-13.9	H	3.0	40.1	1.0	-53.0	-13.0	-40.0	
7.0100	-11.2	H	3.0	39.3	1.0	-49.6	-13.0	-36.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4
5MHz
16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 7, 5MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1712.5MHz)									
3.4250	-21.2	V	3.0	39.5	1.0	-59.7	-13.0	-46.7	
5.1375	-13.9	V	3.0	40.1	1.0	-53.0	-13.0	-40.0	
6.5800	-11.5	V	3.0	39.5	1.0	-50.1	-13.0	-37.1	
3.4250	-21.3	H	3.0	39.5	1.0	-59.8	-13.0	-46.8	
5.1375	-13.7	H	3.0	40.1	1.0	-52.8	-13.0	-39.8	
6.5800	-11.3	H	3.0	39.5	1.0	-49.8	-13.0	-36.8	
Mid Channel (1732.5MHz)									
3.4650	-21.8	V	3.0	39.4	1.0	-60.2	-13.0	-47.2	
5.1975	-14.9	V	3.0	40.1	1.0	-54.0	-13.0	-41.0	
6.9300	-10.6	V	3.0	39.4	1.0	-48.9	-13.0	-35.9	
3.4650	-21.9	H	3.0	39.4	1.0	-60.3	-13.0	-47.3	
5.1975	-15.1	H	3.0	40.1	1.0	-54.2	-13.0	-41.2	
6.9300	-10.3	H	3.0	39.4	1.0	-48.6	-13.0	-35.6	
High Channel (1752.5MHz)									
3.5050	-20.2	V	3.0	39.4	1.0	-58.6	-13.0	-45.6	
5.2575	-12.8	V	3.0	40.1	1.0	-51.9	-13.0	-38.9	
7.0100	-11.6	V	3.0	39.3	1.0	-49.9	-13.0	-36.9	
3.5050	-20.2	H	3.0	39.4	1.0	-58.6	-13.0	-45.6	
5.2575	-13.9	H	3.0	40.1	1.0	-53.0	-13.0	-40.0	
7.0100	-11.2	H	3.0	39.3	1.0	-49.6	-13.0	-36.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4
3MHz
QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 3MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1711.5MHz)									
3.4230	-23.3	V	3.0	39.5	1.0	-61.7	-13.0	-48.7	
5.1345	-16.2	V	3.0	40.0	1.0	-55.2	-13.0	-42.2	
6.8460	-14.6	V	3.0	39.4	1.0	-53.0	-13.0	-40.0	
3.4230	-23.3	H	3.0	39.5	1.0	-61.8	-13.0	-48.8	
5.1345	-16.1	H	3.0	40.0	1.0	-55.1	-13.0	-42.1	
6.8460	-14.3	H	3.0	39.4	1.0	-52.7	-13.0	-39.7	
Mid Channel (1732.5MHz)									
3.4650	-23.7	V	3.0	39.4	1.0	-62.1	-13.0	-49.1	
5.1975	-17.1	V	3.0	40.1	1.0	-56.2	-13.0	-43.2	
6.9300	-12.7	V	3.0	39.4	1.0	-51.1	-13.0	-38.1	
3.4650	-24.2	H	3.0	39.4	1.0	-62.6	-13.0	-49.6	
5.1975	-17.4	H	3.0	40.1	1.0	-56.5	-13.0	-43.5	
6.9300	-12.4	H	3.0	39.4	1.0	-50.7	-13.0	-37.7	
High Channel (1753.5MHz)									
3.5070	-22.3	V	3.0	39.4	1.0	-60.7	-13.0	-47.7	
5.2605	-14.3	V	3.0	40.1	1.0	-53.4	-13.0	-40.4	
7.0140	-13.8	V	3.0	39.3	1.0	-52.1	-13.0	-39.1	
3.5070	-22.4	H	3.0	39.4	1.0	-60.8	-13.0	-47.8	
5.2605	-15.9	H	3.0	40.1	1.0	-55.0	-13.0	-42.0	
7.0140	-13.5	H	3.0	39.3	1.0	-51.8	-13.0	-38.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4
3MHz
16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 3MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1711.5MHz)									
3.4230	-23.3	V	3.0	39.5	1.0	-61.7	-13.0	-48.7	
5.1345	-16.2	V	3.0	40.0	1.0	-55.2	-13.0	-42.2	
6.8460	-14.6	V	3.0	39.4	1.0	-53.0	-13.0	-40.0	
3.4230	-23.3	H	3.0	39.5	1.0	-61.8	-13.0	-48.8	
5.1345	-16.1	H	3.0	40.0	1.0	-55.1	-13.0	-42.1	
6.8460	-14.3	H	3.0	39.4	1.0	-52.7	-13.0	-39.7	
Mid Channel (1732.5MHz)									
3.4650	-23.7	V	3.0	39.4	1.0	-62.1	-13.0	-49.1	
5.1975	-17.1	V	3.0	40.1	1.0	-56.2	-13.0	-43.2	
6.9300	-12.7	V	3.0	39.4	1.0	-51.1	-13.0	-38.1	
3.4650	-24.2	H	3.0	39.4	1.0	-62.6	-13.0	-49.6	
5.1975	-17.4	H	3.0	40.1	1.0	-56.5	-13.0	-43.5	
6.9300	-12.4	H	3.0	39.4	1.0	-50.7	-13.0	-37.7	
High Channel (1752.5MHz)									
3.5070	-22.3	V	3.0	39.4	1.0	-60.7	-13.0	-47.7	
5.2605	-14.3	V	3.0	40.1	1.0	-53.4	-13.0	-40.4	
7.0140	-13.8	V	3.0	39.3	1.0	-52.1	-13.0	-39.1	
3.5070	-22.4	H	3.0	39.4	1.0	-60.8	-13.0	-47.8	
5.2605	-15.9	H	3.0	40.1	1.0	-55.0	-13.0	-42.0	
7.0140	-13.5	H	3.0	39.3	1.0	-51.8	-13.0	-38.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4
1.4MHz
QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 1.4MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1710.7MHz)									
3.4214	-24.2	V	3.0	39.5	1.0	-62.7	-13.0	-49.7	
5.1321	-19.6	V	3.0	40.0	1.0	-58.7	-13.0	-45.7	
6.8428	-18.1	V	3.0	39.4	1.0	-56.5	-13.0	-43.5	
3.4214	-24.0	H	3.0	39.5	1.0	-62.5	-13.0	-49.5	
5.1321	-19.8	H	3.0	40.0	1.0	-58.9	-13.0	-45.9	
6.8428	-17.9	H	3.0	39.4	1.0	-56.3	-13.0	-43.3	
Mid Channel (1732.5MHz)									
3.4650	-12.0	V	3.0	39.4	1.0	-50.4	-13.0	-37.4	
5.1975	-20.5	V	3.0	40.1	1.0	-59.6	-13.0	-46.6	
6.9300	-16.1	V	3.0	39.4	1.0	-54.5	-13.0	-41.5	
3.4650	-26.0	H	3.0	39.4	1.0	-64.4	-13.0	-51.4	
5.1975	-20.5	H	3.0	40.1	1.0	-59.7	-13.0	-46.7	
6.9300	-15.7	H	3.0	39.4	1.0	-54.0	-13.0	-41.0	
High Channel (1754.3MHz)									
3.5086	-26.8	V	3.0	39.4	1.0	-65.2	-13.0	-52.2	
5.2629	-20.0	V	3.0	40.1	1.0	-59.1	-13.0	-46.1	
7.0172	-16.7	V	3.0	39.3	1.0	-55.0	-13.0	-42.0	
3.5086	-25.7	H	3.0	39.4	1.0	-64.1	-13.0	-51.1	
5.2629	-20.1	H	3.0	40.1	1.0	-59.2	-13.0	-46.2	
7.0172	-16.0	H	3.0	39.3	1.0	-54.3	-13.0	-41.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.

LTE

Band 4
1.4MHz
16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 15K20096
Date: 03-06-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 4, 1.4MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (1710.7MHz)									
3.4214	-26.3	V	3.0	39.5	1.0	-64.8	-13.0	-51.8	
5.1321	-19.6	V	3.0	40.0	1.0	-58.7	-13.0	-45.7	
6.8428	-18.1	V	3.0	39.4	1.0	-56.5	-13.0	-43.5	
3.4214	-27.5	H	3.0	39.5	1.0	-66.0	-13.0	-53.0	
5.1321	-19.8	H	3.0	40.0	1.0	-58.9	-13.0	-45.9	
6.8428	-17.9	H	3.0	39.4	1.0	-56.3	-13.0	-43.3	
Mid Channel (1732.5MHz)									
3.4650	-26.6	V	3.0	39.4	1.0	-65.0	-13.0	-52.0	
5.1975	-20.5	V	3.0	40.1	1.0	-59.6	-13.0	-46.6	
6.9300	-16.1	V	3.0	39.4	1.0	-54.5	-13.0	-41.5	
3.4650	-27.3	H	3.0	39.4	1.0	-65.7	-13.0	-52.7	
5.1975	-20.5	H	3.0	40.1	1.0	-59.7	-13.0	-46.7	
6.9300	-15.7	H	3.0	39.4	1.0	-54.0	-13.0	-41.0	
High Channel (1754.3MHz)									
3.5086	-26.8	V	3.0	39.4	1.0	-65.2	-13.0	-52.2	
5.2629	-20.0	V	3.0	40.1	1.0	-59.1	-13.0	-46.1	
7.0172	-16.7	V	3.0	39.3	1.0	-55.0	-13.0	-42.0	
3.5086	-25.7	H	3.0	39.4	1.0	-64.1	-13.0	-51.1	
5.2629	-20.1	H	3.0	40.1	1.0	-59.2	-13.0	-46.2	
7.0172	-16.0	H	3.0	39.3	1.0	-54.3	-13.0	-41.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Confidential
This report shall not be reproduced except in full, without the written approval of UL Korea, Ltd.